Returns to education from different perspectives

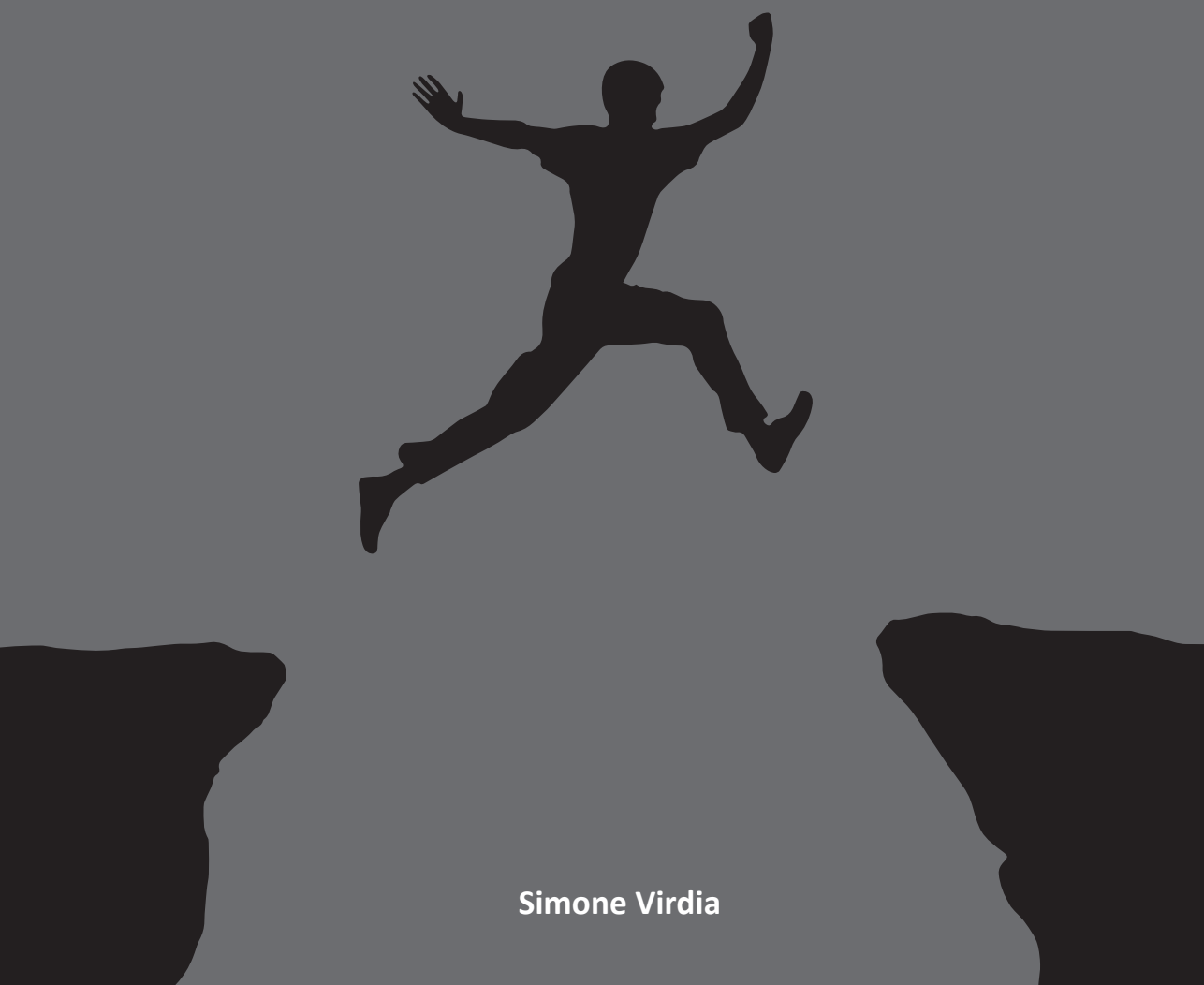
Virdia, S.

Publication date:
2018

Document Version
Publisher's PDF, also known as Version of record

Returns to education from different perspectives

Macro determinants, micro mechanisms, and unconventional educational pathways in the transition/s from school to work.



Simone Virdia

Returns to education from different perspectives.

Macro determinants, micro mechanisms, and unconventional educational pathways in the transition/s from school to work.

Simone Virdia

S. Virdia
Returns to education from different perspectives.
Macro determinants, micro mechanisms, and unconventional educational pathways in the transition/s from school to work.

ISBN: 978-94-6375-145-2

Design cover: Thomas van der Vlis, persoonlijkproefschrift.nl
Layout: Thomas van der Vlis, persoonlijkproefschrift.nl
Printing: Ridderprint BV | www.ridderprint.nl

University of Trento & Tilburg University

Returns to education from different perspectives.

Macro determinants, micro mechanisms, and unconventional educational pathways in the transition/s from school to work.

Proefschrift

ter verkrijging van de graad van doctor
aan Tilburg University
op gezag van de rector magnificus, prof.dr. E.H.L. Aarts,
en de University of Trento
op gezag van de rector magnificus, Prof.dr. P. Collini,
in het openbaar te verdedigen ten overstaan
van een door het college voor promoties aangewezen commissie
in de Portrettenzaal van de Universiteit
op dinsdag 18 december 2018 om 10.00 uur

door

Simone Virdia

geboren te Trento, Italië

Promotores:
Prof. Dr. S. Scherer
Prof. Dr. P.M. de Graaf

Copromotor:
Dr. A.R.C.M. Luijkx

Overige commissieleden:
Prof. Dr. M.H.J. Wolbers
Prof. Dr. D. Reimer
Prof. Dr. P. Barbieri
Dr. I.J.P. Sieben
Dr. M. Triventi

Table of contents

1

Introduction and background

Introduction

The transition from school to work is a decisive step towards adult life. After leaving formal education, young adults are ready to apply skills and knowledge they have acquired at school in a job that satisfies their training and personal preferences. Job entry is the primary outcome of the match between job seekers and available vacancies (Bills 2003). The process leading to this outcome, however, is complex, and a bad start into the labour market negatively influences later career development (Korpi et al. 2003; Gangl 2005, Luijkx and Wolbers 2009, Barone and Schizzerotto, 2011). Due to its importance, this field of research has received considerable attention.

Scholars have identified several trends and patterns in most industrialized countries over the past two decades which are expected to affect young adults' integration into the labour market (for a review see Bills 2003 and Raffe 2014). First, levels of participation in education have risen as a consequence of both labour market demands for qualifications and government policies. Rising levels of educational attainment have also pushed many governments to introduce new processes of educational diversification, especially at the tertiary level of education (Bills 2003, Triventi 2013). Educational diversification takes different forms: extending the tracking system generally associated with secondary education to the post-secondary and tertiary levels is one way to deal with the increasing participation rates and, consequently, heterogeneity of students in higher education.

Second, individuals' transition into stable employment has become more complex and less linear than in previous generations. In the literature, the school-to-work transition is generally defined as the period between the last formal educational episode and stable settlement into the labour market (Shavit and Müller 1998; 2000, Müller and Gangl 2003). These studies have generally focused either on the first significant job or on the job at some specific points in individuals' lives. The development of life-course research and the increasing availability of longitudinal datasets have underlined the importance of treating school-to-work transitions as a sequence of events in which individuals may switch between episodes of schooling and employment before "career maturity" is reached (i.e. Hillmert and Jacob 2003, Hillmert and Jacob 2010, Jacob and Weiss 2010), or may combine work and education, postponing the attainment of a qualification (Roksa and Velez 2010, Weiss and Roksa 2016).

Third, as the supply of qualifications multiplies and diversifies, the role these play changes and diversifies as well (Bills 2003). The economic returns of educational credentials have become a complicated issue for many reasons. The fact that higher levels of education are associated with better labour market opportunities is probably the least

controversial finding in the sociological and economic literature. However, the signalling power of educational credentials at the time of hiring is neither time-independent nor context-independent. A hiring criterion works only to the extent that employers trust it as a reliable source of information (Bills 2003). As suggested by Bills (2003), the signalling role of education in contemporary societies is probably different than some decades ago. Moreover, the signalling power of educational credentials varies depending on the institutional context in which the hiring takes place (Di Stasio 2014) and on the vacancy for which the selection has to be made (De Wolf and Van der Velden 2001). Besides formal credentials, other scholars suggest that the labour market is increasingly demanding skills that are not directly related to formal education. These include specific personality traits, as well as more transferable and transversal skills. These demands further complicate the mechanisms that influence school leavers' transition into the labour market (Bowles and Gintis 2002, Jackson et al. 2005, Jackson 2007). Employers are directly involved in the allocation of school leavers to jobs. The fact that education and other attributes are associated with employment outcomes depends on the decision-making process that involves employers and job seekers in connection with specific vacancies. In practical terms, any labour market outcome, such as wage and socioeconomic status, is related to the process of matching supply and demand.

This thesis can then be broadly tied to the debate on returns on educational credentials and skills. Each empirical chapter contributes to this field of research by providing evidence for some of the aforementioned trends and patterns characterizing school leavers' integration in the labour market. More precisely the focus is on macro determinants, micro mechanisms, and destandardized educational pathways in the transition to employment. Furthermore, these approaches are linked to the debate on inequality of opportunities, and whether different patterns of labour market entry and the moderating role of the institutional context weakens or reinforces the social stratification of labour market outcomes. Educational as well as occupational opportunities are well known to be socially stratified in terms of personal characteristics and resources. In modern society, education is certainly the most important criterion influencing the occupational opportunities of school leavers; however, social class also plays a direct role in shaping the stratification of labour market outcomes (Breen and Luijkx 2004, Ballarino and Bernardi 2016). The association between social origin and occupational destination among people with the same level of education represents the most obvious form of inequality. On the other hand, despite the direct effect of social origin on occupation, a large part of the stratification of labour market outcomes is due to processes of stratification in educational trajectories and choices (Breen and Luijkx

2004). The distribution of students across study programmes is far from even (Checchi and Flabbi 2007, Azzolini and Barone 2012), which generates segregation processes within tracks and therefore contributes to the formation of educational inequality, and later occupational inequality in society.

Chapter 2 places the school-to-work transition in a comparative and macro-micro perspective. Two questions are investigated: firstly, to what extent are institutional features of the education and training systems that should enhance the linkage between acquired and required skills, such as the level of differentiation and vocational specificity, actually associated with job placement outcomes? This question has been extensively examined by scholars (Shavit and Müller 1998, Levels et al. 2014). The novelty of this chapter, however, is to differentiate between features of secondary and tertiary education and training systems. To the best of our knowledge, this has not been addressed before despite its relevance, especially in times of educational expansion. Secondly, we consider whether the aforementioned institutional arrangements account for more equal job allocation processes, reducing the gap between persons of different social origins at labour market entry.

In Chapter 3, the school-to-work transition is analysed from a life-course perspective. Previous studies have mostly focused on transition patterns at specific points in individuals' lives, primarily due to the unavailability of longitudinal datasets. Less attention has been devoted to the dynamic process through which individuals enter the labour market, especially when associated with re-enrolment into formal education. The focus is therefore on decisions to upgrade educational credentials over the life course and the extent to which educational upgrading determines both career advancement and the development of occupational inequality in Germany. The contribution of this chapter is then to analyse educational attainment as a dynamic process which may shape both intra- and intergenerational mobility processes over the life-course.

Chapter 4 focuses on returns to education investigating how different attributes of job seekers' educational and non-educational profiles enter into an employer's hiring decision. Previous research has often inferred employers hiring behaviour from supply-side surveys (cf. Breen et al. 1995, Scherer 2005), while studies that consider the point of view of job recruiters and the micro-processes that culminate in a hiring transaction are still rare. By means of a quasi-experimental design – the so-called vignette study - the chapter analyses the selection preferences of employers over a pool of job candidates applying for the same job but differing in their educational and non-educational profiles. Furthermore, the micro-processes culminating in a hiring decision are investigated in two types of jobs. In line with previous studies, we assume hiring preferences to be

dependent not only upon characteristics of employees, but also on the match between required and acquired attributes, which is likely to vary across types of jobs (De Wolf and Van der Velden 2001).

The last contribution of this thesis examines the topic of school segregation and inequality of educational opportunities. Scholars dealing with social stratification processes have documented how educational choices and trajectories are socially stratified (Breen and Jonsson 2005). The school choice process after comprehensive education is not exempted (Checchi and Flabbi 2007, Azzolini and Barone 2012). Students with an immigrant background as well as students of disadvantaged social origin are more likely to enrol in a vocational track rather than in the academic track, even when students' abilities are taken into account. This leads to school composition and segregation processes which, as a result, might affect students' educational and occupational outcomes. More precisely, in this chapter we investigate whether ethnic segregation processes in different upper-secondary school types affect students' school performance in mathematics and reading. Furthermore, the chapter looks at whether the process of ethnic segregation is also associated with other compositional inequality at the school level.

In the remainder of this introduction, we first review the theoretical literature that addresses returns on education at the macro and micro levels and the possible implication for the development of social inequalities. Then each empirical chapter is summarised and general conclusions are presented.

Theoretical background and literature

The macro level perspective

The macro perspective conceives the school-to-work transition as a process influenced by factors that are outside the direct control of the actors involved in the transition. According to this view, "institutions are enduring sets of arrangements that provide the macro-level opportunity structure within which employers and employees operate" (Di Stasio 2014: 27). This perspective, therefore, raises questions about the role of different institutional arrangements in shaping the transition process of school leavers in different countries. Both the arrangement of the education and training system (i.e. degree of differentiation, tracking, vocational orientation and specificity) and of the labour market (i.e. employment protection legislation) received significant attention from scholars (Allmendinger 1989, Shavit and Müller 1998, Müller and Gangl 2003, Heijke et al. 2003,

Breen 2005, Blossfeld et al. 2005, Scherer 2005, Wolbers 2007, Raffe 2008, Kogan et al. 2011, Bol and Van de Werfhorst 2011, Levels et al. 2014, de Lange et al. 2014, Barbieri and Cutuli 2015, Barbieri et al. 2016). The thesis focuses on characteristics of the educational and training systems and more precisely on their level of differentiation and vocational specificity.

The degree of differentiation can be defined along two dimensions: *tracking* and *vocational orientation* (Bol and Van de Werfhorst 2010). Tracking refers to the number of programmes offered by the education system at the same point in time and to the timing in which students are first differentiated into distinct branches of education. Vocational orientation denotes the extent to which educational systems provide vocational programmes. A country is vocationally oriented when a large proportion of students in upper secondary education are enrolled in secondary vocational tracks. Conversely, a low enrolment rate in vocational schools indicates that a country tends to provide students with general skills.

Besides the vocational orientation, the *specificity* of skills taught in vocational programmes largely differs across educational systems (Shavit and Müller 1998, Bol and Van de Werfhorst 2011, 2013). The distinction between different types of vocational education is mainly determined by the occupation-specific component of the vocational training. A strong on-the-job training component leads to smoother and more adequate transitions to employment. This is because highly specific skills can be transmitted and the training period can serve as pre-screening, lowering the cost of selection and allocation afterwards. The employment advantage of these types of qualification will generally depend on employers' involvement in the training offer, known as *institutional linkages* (Hannan et al. 1996).

Bol and Van de Werfhorst (2011) find that educational achievements exert a stronger role in placing students in the labour market the more vocationally oriented and differentiated the education and training system is. Similar findings were also supported by other scholars. School leavers in countries characterized by well-defined vocational training were shown to have a smoother transition into the labour market (Scherer 2005, Wolbers 2007), with a low risk of occupational mismatch (Wolbers 2003, Levels et al. 2014), and low risk of entering the employment system as un-skilled or under-skilled workers (Shavit and Müller 1998, Levels et al. 2014). The vocational orientation alone, however, is not sufficient to guarantee a smooth and adequate transition into the labour market, but a successful transition is generally associated with programmes offering intense on-the-job training, such as apprenticeships (Levels et al. 2014). The strong linkage between schools and firms increases the transparency of skills, since the school

sends clear signals to employers about the potential productivity of a given job seeker (Andersen and Van de Werfhorst 2010).

Institutional factors can also weaken or strengthen the association between the social origin of individuals and their educational and occupational opportunities (Brunello and Checchi 2007, Van de Werfhorst and Mijs 2010) and may thus contribute to inequality in society. On the one hand, in educational systems where qualifications come with clear information and are reliable signals of skills (Andersen and Van de Werfhorst 2010, Bol and Van de Werfhorst 2011), educational credits play a major role in the allocation of jobs to individuals, making ascriptive characteristics such as social origin less important.

Differentiated educational systems, however, were also shown to be mechanisms for the reproduction of educational inequalities across generations (Brunello and Checchi 2007, Van de Werfhorst and Mijs 2010). The distance in educational performance between privileged and underprivileged students is larger in highly differentiated educational systems compared to less differentiated ones (Brunello and Checchi 2007). Parental background has a stronger effect on educational choices at a younger age than later in life (Mare 1980, Shavit and Blossfeld 1993, Kerckhoff 1995). As children progress through the educational system, students from lower socioeconomic classes as well as students with an immigration background are typically placed in lower educational tracks which, in turn, reduces their chances of attending university (Shavit 1990a) and entering privileged occupational positions.

The micro level perspective

At the micro level, the school-to-work transition reflects the match between job seekers and available vacancies (Di Stasio 2014). The process leading to this outcome, however, is complex and delicate with long-term implications for both employers and employees. On the one hand, there are employers who seek and evaluate job applicants; on the other hand, there are workers who seek and evaluate employers and job offers (Bills 2003). Both actors are active participants in the hiring process. This perspective therefore raises questions about the individual's characteristics and assets that influence the school-to-work transition of school leavers. Matching employees to jobs necessarily involves employers and job seekers coming to a positive decision about a specific position (Bills 2003). Success in the labour market is then determined by the match between required and acquired skills (Sattinger 1993). Firms spend substantial amount of money on advertising jobs and interviewing candidates in order to find the best applicant. When a

worker quits a job to find a better position, this represents a considerable loss of specific training.

In modern societies, education is shown to be the most important criteria in the allocation of young adults to jobs, especially at labour market entry. A number of explanations have been proposed about what information education sends to job recruiters. Theories differ in explaining the role of educational credentials in securing employment at the time of job entry. The human capital theory states that education matters to employers because it enhances the productivity of workers (Mincer 1973, 1993, 1994, Becker 1962, 1975, 1993). By investing in education, individuals can improve their productivity in such a way as to raise their future labour market value.

A second perspective argues that the productivity of workers is unknown at the time of hiring and education signals other attributes that are indirectly related to productivity (Spence 1973, Arrow 1973, Stiglitz 1975b, Spring 1976, Weiss 1995). Education is, therefore, a positional good that predicts productivity in an indirect way. For instance, qualifications can be informative about a candidate's ability and readiness to acquire knowledge and skills – what Thurow (1976) refers to as "trainability".

Broadly speaking, highly educated workers have more positive labour market outcomes compared to less educated workers, e.g. higher wages, more prestigious jobs, and lower risk of being unemployed. Job assignment, however, does not only require ever higher levels of education but also more specialized education (Bills 2003). As levels of education in the population rise (through educational expansion), so less information is provided to employers about the productivity of those who possess it (Goldthorpe 1996, Breen and Goldthorpe 1999, 2001, Jackson et al. 2005, Jackson 2007). Moreover, as the supply of educational credentials increases and becomes more diversified, the information sent by credentials will also change and diversify. In such circumstances, employers may attach increasing relevance to other characteristics, such as specific specializations (Van de Werfhorst 2002), other non-formal credentials, the prestige of the educational provider (Goldhorpe 2014), the acquisition of skills, certifications through standardized tests, previous experience, and other attributes only marginally related to education, such as transversal skills (de Wolf and Van der Velden 2001, Jackson 2007, Dörfler and Van de Werfhorst 2009, Humburg and Van der Velden 2015). It is therefore important to study the process of decision-making, analysing how employers evaluate and select new workers in order to better understand how both educational and non-educational attributes influence job allocation processes (Rivera 2012).

Another matter to consider is that education does not exert the same role across institutional contexts and types of jobs. Scholars have shown that the role of education

depends on the institutional framework in which job transactions take place (Shavit and Müller 1998, Bol and Van de Werfhorst 2011, Di Stasio and Van de Werfhorst 2016) and the characteristics of the vacancy (Spence 1973, Hartog and Oosterbeek 1988, Sattinger 1993, de Wolf and Van der Velden 2001). Therefore, educational records should not be seen as operating in some single mode (Goldthorpe 2014). Educational and non-educational attributes exert a role only in so far as they are taken into consideration by employers. The latter may attach different meanings and values to education-related attributes in accordance with the context, economic sector, type of employment, type of qualification, legal constraints, and personal preferences.

Besides educational records, other personal characteristics have been shown to matter when entering the labour market. The debate on inequality of opportunities, and more precisely the association between social origin and occupational destination, has received considerable attention in the literature (Blossfeld 1987, Kerckhoff 1995, Breen 2004). A noteworthy finding in the social stratification literature is that social origin strongly influences occupational destination, and a large part of this effect is explained by educational attainment (Breen and Jonsson 2005). Social origin, however, plays a role over and beyond what is mediated by education, and is a relevant determinant of labour market opportunities (Breen and Luijkx 2004, Ballarino and Bernardi 2016).

Most studies on intergenerational mobility research have focused on social inequality at limited time points in the life-course. Social origin, however, may not only affect the first placement on the occupational hierarchy, but it may also shape later career advancement (Hillmert 2015). A life-course perspective allows analysing processes of social stratification in a more appropriate way compared to snapshot measures of inequality (Esping-Andersen 1993, DiPrete 2002, Gangl 2005, Wolbers et al. 2011). Depending on when the status is measured in the life course, one may find downward or upward mobility, or no mobility at all (Hillmert 2011). First, individuals may change occupations in order to find a better fit due to over-skilling or job mismatch in their first job. Second, occupational upgrading can be part of intraorganizational career ladders (Doeringer and Piore 1971). Third, factors such as ability, motivation, and professional ambition may also lead to changes on the occupational ladder. Uneven occupational trajectories from the first job onward could indeed shape the development of occupational inequality (Manzoni et al. 2014, Passaretta et al. 2018). These status shifts cannot be grasped without a life-course perspective.

A life-course perspective also allows analysis of decisions to upgrade educational credentials. The school-to-work transition should not be seen as a single episode, but as

a dynamic process in which individuals may exit and re-enter formal education several times in order to improve their occupational opportunities (Hillmert and Jacob 2010, Jacob and Weiss, 2010). This may change the role of educational attainment in mediating the association between social origin and occupational destination.

Summary of the empirical chapters

Vocational specificity at the secondary and tertiary levels and job matching patters in Europe

As previously discussed, it is a well-established finding in the school-to-work transition literature that the characteristics of the education and training system have an important influence on various labour market outcomes (cf. Bol and Van de Werfhorst 2013). One major labour market outcome for assessing the importance of education and the training system is whether school leavers enter the labour market with a job that matches the skills acquired in formal education. This labour market outcome is crucial in two respects: first, the degree of fit between required and acquired skills determines anticipated productivity in a job (Sattinger 1993, Wolbers 2003); second, having an "adequate" job at labour market entry is also crucial for future opportunities. We consider both vertical and horizontal mismatch and we employ what are generally defined as objective measures. Vertical mismatch occurs when an individual is over (or under) qualified for their job (Levels et al. 2014), while with a horizontal mismatch the field of study is not suitable for the job (Wolbers 2003). They have been generally studied separately; however, both raise efficiency problems on the individual and societal levels, as the acquired skills, abilities, and capacities are under-utilized. In this chapter we also propose a combined measure of the two, which to the best of our knowledge has not been studied yet.

Two features of the education and training system are investigated: educational differentiation and vocational specificity. Compared to previous studies, however, we also consider characteristics of tertiary education systems. The ongoing process of educational expansion has pushed several European governments to upgrade processes of educational differentiation from the secondary to higher levels of education (lower-tertiary and tertiary education). Some countries provide alternatives to the traditional research-oriented university that are often designed to prepare students for specific occupations, while other countries do not offer any alternative (Shavit et al. 2007). We reasoned that this increasing differentiation and the targeted vocational orientation of tertiary education should suggest outcomes similar to the secondary level. We

hypothesize that when educational qualifications are more informative, either because the system offers a wider range of qualifications or because employers are directly involved in the training, the allocation of school leavers into the "right" job should be easier. Moreover, if more vocationally specific educational systems come with a tighter linkage between education and labour market position, it should also leave less room for other characteristics to determine the matching process, including social origin.

Empirical analysis is based on the 2009 *ad hoc* module of the EU Labour Force Survey (EU-LFS) on school-to-work transition. We analyse 22 European countries for which we have reliable information at the micro and macro level for the period between 1995 and 2009. In line with a recent paper by Barbieri and colleagues (2016), the empirical strategy is then to explore between-country and within-country variation. Making use of the within-country time dimension is a way to control for other unobserved confounding country characteristics, which puts the empirical findings of this chapter on more solid ground.

We found clear evidence for a positive association between the degree of differentiation and vocational specificity of both secondary and tertiary education systems and school leavers' probability of entering the labour market with a matched job. In other words, educational systems with a wider range of training and with a clear vocational specificity have more efficient job matching processes. Results also hold when exploiting the within-country variation, especially with regard to the index at the tertiary level which has the largest variation between school leaver cohorts.

Besides leading to more efficient job allocation processes, results show a slightly stronger association between the two features of education and training systems and the chance to find a first matched job among those from a less privileged social background compared to those from more privileged origins, therefore reducing the social gap in finding a fitting job.

Educational upgrading and intergenerational mobility in Germany

Chapter 3 analyses the extent to which educational upgrading after labour market entry influences the level of social stratification in occupational status in Germany. The increasing complexity of young adults' integration in the labour market challenges the attempt to define job entry as a single and coherent event. Transitions have become more prolonged, less linear and less predictable (Jacob and Weiss 2010, Raffe 2014, Brzinsky-Fay and Solga 2016). We discuss three relevant aspects that can be expected to follow socially selective patterns and, therefore, determine to what extent educational upgrading influences the overall level of social stratification in labour market outcomes:

the number of people at risk of upgrading, the upgrading propensities of those at risk, and the quality of educational upgrading. The importance of these factors is expected to be different for persons of differing social backgrounds.

The chapter concentrates on Germany, which is an example of an occupational labour market where education and training exhibit a high level of vocational specificity (cf. Müller and Gangl, 2003). This has several implications that are important with regard to the role of educational upgrading. The assumption is that in the German context occupational progression is rather stable over the life course, as suggested by previous studies, unless individuals undertake educational upgrading.

Data are derived from the Starting Cohort 6 of the National Educational Panel Study (NEPS, version 6.0.1), which provides rich retrospective life-course information from a random sample of adults in Germany. We reconstruct individual career trajectories starting from the first significant job until the last employment episode. As the labour market outcome, we employ the International Standard Classification of Occupations (ISCO-88). Depending on the analysis, different analytical strategies are employed: the labour market premium associated with education upgrading is estimated using a difference-in-differences method combined with a matching strategy. Social inequality development over the working life is estimated through random effects growth curve models.

Results can be summarized in three main findings. First, we show that individuals' decision to upgrade educational credentials is not a marginal phenomenon, at least in the German labour market. This provides evidence that transitions into the labour market have become more prolonged, which indeed challenges the attempt to study the school-to-work transition in terms of a single transition (Brzinsky-Fay and Solga 2016).

The second finding concerns individuals' opportunities of career advancement associated with educational upgrading. In line with previous evidence, we also observe that occupational opportunities in Germany are hierarchically distributed across types of qualification. On the one hand, occupational advancement in Germany is to a large extent determined by educational upgrading. On the other hand, gains in occupational status associated with educational upgrading are largely dependent on the "quality" of the upgrading, with remarkably higher returns as individuals attain both higher levels of general education and higher order vocational qualifications.

The third contribution is about the potential of educational upgrading to impact the level of social stratification in occupational outcomes. Following the three factors discussed above, we find that persons from disadvantaged social backgrounds are more at risk of educational upgrading compared to persons from advantaged social

backgrounds since on average they have a lower level of education at labour market entry. The propensity to upgrade and the quality of educational upgrading, on the other hand, work in favour of those from privileged social backgrounds; however, these processes do not alter the level of social stratification in occupational outcomes over the occupational life course. Instead, our results seem to confirm the view that the social stratification of initial educational attainment (at labour market entry) is the key driving force of the social stratification of labour market outcomes in Germany.

Educational and non-educational attributes and employers hiring preferences

In order to gain a better understanding of school-to-work transition processes, it is also important to study the process of decision making that culminates in a hiring (Bills 1990, Breen et al. 1995, Rivera 2012). Chapter 4 focuses on the micro-processes leading to a successful employment transaction. More precisely, the chapter investigates the extent to which different attributes of job seekers' educational and non-educational profiles enter into employers' hiring decisions.

In line with previous study (De Wolf and Van der Velden 2001, Di Stasio 2014, Humburg and Van der Velden 2015), we reasoned that a CV, even in its simplest form, transports a multitude of information about the job applicant, including information on previous education and occupational records. In this chapter different dimensions are assessed simultaneously, improving our understanding about the mechanisms that make education profitable in the labour market. We hypothesize that hiring is not only dependent upon characteristics of job seekers, but also on characteristics of the vacancy for which the selection has to be made (Hartog 1988, Sattinger 1993). The micro-processes culminating in a hiring transaction were then investigated for two different types of jobs. This helps to understand whether the ways employers make use of formal education for hiring decisions differ across types of jobs and which dimensions prevail in one or the other type.

We ran a vignette study to look into the details of employers' hiring decisions. A vignette study creates hypothetical profiles of job applicants and then asks job recruiters to engage in a simulation exercise that mimics a real hiring scenario. We collected original data involving experts in job recruiting. To keep the context constant, we concentrated on one industrial sector in Italy. Italy is characterized by a moderate degree of differentiation in secondary education and training systems and by a unified tertiary education system. Moreover, it is a country that has been described as having a rather weak linkage between formal education and occupational destination (Schizzerotto and Barone 2006), in contrast to countries such as Germany. We focused on technical occupations, for

which employers still have a rather large degree of discretion in hiring decisions. Two jobs belonging to different types were then selected. We employed the classification proposed by De Wolf and Van der Velden (2001) who distinguish between professional, sector-specific, and general jobs. What is expected to vary between these three types of jobs is the relevance of different types of skill for hiring decisions.

Dimensions can be clustered into three groups of skills, which can be signalled by different attributes: sector-specific skills (represented by fields of study and internship), cognitive skills (represented by level of education, grades, job autonomy and problem solving), and transversal skills (represented by communication and team-working skills).

The design distinguishes two steps in the hiring process which represent two different outcome variables: the screening of a pool of job candidates and the ranking of a shortlist of the four best candidates. Candidates are ordered from the one with the highest probability of being invited to a job interview to the candidate with the lowest probability.

In line with our prediction and with previous studies, for vacancies in which job tasks are clearly defined, which is the case of professional jobs, attributes signalling the match between acquired and required knowledge and skills, such as fields of study and internship in the field, are what employers rely on in order to select job applicants. Only when candidates are screened based on sector-specific skills may other attributes enter into employers hiring preferences, such as being able to solve complex tasks in full autonomy. Conversely, for vacancies in which job tasks are only broadly defined and may involve multiple types of skills, which is the case of general jobs, employers assign greater importance to applicants' attributes showing skills transferable to different tasks, such as having a university degree. Sector-specific skills, however, are also important for general jobs.

Tracking selectivity and ethnic peer pressure in Italian upper secondary schools

The social stratification of labour market opportunities is closely related to the selectivity of educational programmes. Scholars dealing with social stratification processes have documented how educational choices and trajectories are socially stratified (Buchmann and Hannum 2001, Kerckhoff 2001, Kao and Thompson 2003) and how these processes largely determine occupational opportunities later in life. Educational trajectories within tracking systems generally differ in terms of purposes, subjects covered, academic standards, and prestige. Early tracking was shown to negatively affect the performance of students that come to school with language and social deficits (Entorf and Lauk 2008),

exacerbating the low school performance of the most disadvantaged, such as non-native students.

This last chapter combines two strands of research – research on social stratification in educational opportunities and research on school segregation and peer effects. By bringing together the two perspectives, we argue that if ascribed characteristics such as immigration status influence the distribution of students across school types (beyond students' ability), this would affect the educational opportunities of different social groups and further increase educational inequality.

More precisely, the chapter investigates whether ethnic segregation processes in different upper-secondary school types affect students' school performance to a different extent and whether the process of ethnic segregation is also associated with other compositional inequality at the school level. The chapter focuses on Italy, which is characterized by a relatively early tracking and strong effects of social-origin and immigration status on students' school choice (Checchi and Flabbi 2007, Azzolini and Barone 2012).

Data are derived from the 2009 and 2012 OECD Programmes for International Study Assessment (PISA). Empirical analysis focuses on reading and mathematical abilities in an effort to understand whether the school's ethnic segregation exerts a negative effect on literacy and numeracy. Due to the hierarchical two-level structure of PISA data, we employ multilevel models. We will also test whether school ethnic segregation has a non-linear effect and more precisely whether the effect is driven by schools at the extremes of the ethnic segregation distribution.

In line with previous studies, we observe that the distribution of students with an immigrant background into different tracks is socially stratified. Non-native students are more represented in the vocational track than the general and technical track; these tracks differ in terms of purposes, subjects, and prestige, with the vocational trajectory being the least prestigious and demanding. Further, non-native students appear to be doubly penalized since the quality of teachers decreases and the proportion of students from disadvantaged parental backgrounds increases in vocational schools where they are better represented. This leads to segregation processes that may exacerbate the development of inequality in educational opportunities.

With regard to the effect of the school's ethnic composition on students' performance, we show that the effect varies between tracks and it is generally non-linear. Specifying these effects as linear often leads to inaccurate conclusions. We observe that the effect on both natives and non-natives is not significant in general and technical schools. In vocational schools, on the other hand, the proportion of immigrants is linearly

associated with non-natives' performance, while, it affects natives only beyond the threshold of 20 percent. These differences could be related to the selectivity of immigrant students in different tracks.

General conclusions

This thesis mainly contributes to two areas of research. First, it contributes to the topic of returns on education, investigating school leavers' transition into the labour market from different perspectives. Second, it contributes to an understanding of inequality of opportunities, investigating the effects of different patterns of labour market entry as well as the moderating role of the institutional context on the social stratification of labour market opportunities. Each chapter can be linked to more or less specific and well-researched fields of study, providing new evidence on aspects often neglected in the literature. This makes the overall contribution to a large extent empirical; however, more theoretical considerations can also be drawn.

Earlier we discussed several trends and patterns that have affected almost all industrialized countries in the past decades and which scholars expect to affect school leavers' integration into the labour market. First, rising levels of educational attainment have pushed many governments to introduce a tracking system at the post-secondary/ tertiary level. Second, transitions into the labour market have become more prolonged and less linear. Third, the types of skills believed to be important for labour market success have changed, with increasing attention being given to general and transversal skills. Finally, despite educational expansion and increasing attention to social inequality, the social stratification of educational and occupational opportunities remains high.

The debate on different models of skill formation systems and the implications for youth integration into the labour market is still widely discussed by scholars. In times of economic unrest and technological development, debate continues about the role played by different types of skills for labour market integration and success. The occupational structure of contemporary Western economies is changing, with a decline in manufacturing and a steady growth of the service sector (both private and public). Besides changes in the occupational structure, there are also important changes and developments within occupations (Van de Werfhorst 2014). Due to rapid technological change, some scholars argue that upskilling of the workforce through lifelong learning is more crucial than ever to avoid the risk of skills obsolescence (Allen and de Grip 2012). Specific skills taught in vocational programmes are at risk of quickly becoming outdated.

The education and training system should prepare students with general and transversal skills that better prepare workers for upskilling later in life and are more transferable between economic sectors (Hanushek et al. 2011).

Other scholars suggest that the shift from a manufacturing to a service economy should not harm the overall system of skills formation as long as the training system is able to upgrade and adapt to the changing character of the service economy (Anderson and Hassel 2013). Therefore, it is the overall provision of training that needs to be updated in order to meet more recent skills demand, such as the balance between specific and generic skills. National economies will not necessarily converge on one model due to the changing demand of skills, but will develop along distinct trajectories based on their own advantages and peculiarities (Anderson and Hassel 2013, Raffe 2014).

At the aggregate level, scholars have shown how educational expansion brings about both vertical and horizontal diversification (Bills 2003). European countries have coped in different ways with the increasing heterogeneity in higher education, in terms of motivation, competences, and career prospects of students and many countries have also extended processes of differentiation and the targeted vocational component to higher levels of education (to lower tertiary and tertiary levels). The big challenge is how to organize vocational programmes, as well as academic programmes, so that they effectively meet changing labour market demands (Van de Werfhorst 2014).

From previous studies, we have learned that secondary vocational training systems help to speed up the transition from school to work, lower the risk of job mismatch, and reduce the risk of unemployment, especially when a strong on-the-job component is provided. These findings seem to be corroborated by more recent research, suggesting that educational systems with a well-defined secondary vocational training continue to do better in allocating school leavers on the labour market (Levels et al. 2014, Barbieri et al. 2016).

This thesis also provides evidence that substantiates these findings, showing how more differentiated and vocationally specific education and training systems provide more efficient job matching patterns. Besides testing the effect of features of secondary education systems, we have augmented previous findings by assessing the effect of features of tertiary education systems, which is still downplayed in the literature. First, we show how European higher education systems differ with regard to the training offered at the tertiary level; indeed countries seem to being developing along distinct trajectories. Second, we show that the degree of differentiation of the tertiary level and its vocational component facilitates the transition process of school leavers to a matched job, similar to (but independent from) the secondary level.

Introducing the tracking system at the tertiary level may be the result of two different trends. First, it could be related to the process of educational expansion. As participation in higher education increases, the role played by educational credentials changes and more diversification is needed in order to provide more informative signals to employers at the time of hiring (Van de Werfhorst 2014). Tracking is one form of diversification. Second, introducing educational programmes that are designed to prepare students for more or less specific occupations could also be the result of the increasing demand for workers with more years of schooling, but at the same time with highly specific skills needed to perform these occupations. In general, the distinction between academic and vocational programmes is not entirely appropriate for the tertiary level, since all programmes in higher education are meant to prepare students for certain occupations. Traditional research-oriented universities, however, are generally meant to prepare for professional jobs. Universities of applied sciences and short-cycle programmes, are more likely to prepare students for technical and other medium-high level occupations, which indeed may require increasing levels of schooling due to technological development, without, however, losing specific skills in vocational fields.

The aforementioned findings, including those provided in this thesis, focus on school leavers' transition into the first employment, while we still know little about the long term effect of vocational skills over the life-course. Thus, the thesis does not provide any evidence regarding the penalty of specific skills in the long-run, such as whether they become obsolete faster than more generic and transversal skills.

At the micro level, the thesis contributes to the debate on returns on different types of skills in two ways, providing evidence for two relevant aspects. On the one hand, we have analysed processes of labour market entry in Germany, where education and training exhibit a high level of vocational specificity. More precisely, the chapter provides evidence for the labour market premiums that are attached to different educational qualifications in a country known to have a tight nexus between education and employment outcomes. Previous studies (Baethge and Wolter 2015) have shown how in past decades the German skills formation model has changed. The rising level of competencies required by the labour market and expansion of education has also changed the distribution of apprenticeship contracts between students with different school leaving certificates (Schneider and Tieben 2011). This increasing restriction to formal qualifications does not affect all occupations equally, but it tends to be more common among occupations in the service sectors (administration, banking and insurance, health, and social sector). The dual system in Germany, therefore, is increasingly being reorganized according to occupations and levels of cognitive education. This could be a

response to higher qualification requirements by employers and to the increasing supply of graduates with the *Abitur*, which is the highest school leaving certificate in Germany (Baethge and Wolter 2015).

The third chapter focuses on educational upgrading; we estimate labour market premiums among persons who have been already employed and have decided to re-enrol into formal education. We observe that labour market premiums associated with educational credentials in Germany are to a large extent dependent upon the combination between general and vocational training, with higher returns as individuals attain both higher levels of general education and higher order vocational qualifications. The changing composition of vocational qualification holders and their occupational opportunities may shed some light on returns to general skills in today's occupations, also in countries characterized by a high level of vocational specificity. Nevertheless, the importance of vocational specializations for occupational opportunities remains high, with increasing returns as individuals undertake post-secondary vocational training.

This thesis also contributes to understanding of micro-processes culminating in a hiring transaction by assessing the role played by different types of skills in the hiring process in two different types of job. The focus is on Italy which, in contrast to Germany, is known to have a relatively weak linkage between formal education and occupational outcomes. Linking our findings to the debate on returns on different types of skills in contemporary labour markets, several conclusions can be drawn. Educational sociologists have long argued that employers selecting from a pool of job applicants will most likely opt for the candidate with the highest level of schooling, even though a lower level of education would be sufficient for the tasks (for example opting for the candidate with a Master's degree over candidates with a Bachelor's degree). The reason is that since they have to select job candidates under uncertainty, they will rely on signals that show higher expected productivity, such as higher levels of schooling. In this chapter, we suggest that this is not necessarily the case and will to a large extent depend on the type of job for which the selection has to be made and on the institutional framework in which job recruiting takes place, although we do not specifically investigate this latter level of variability.

The extent to which one or another educational signal pays off depends on employers' reliance on educational qualifications for hiring decisions and the productivity which employers expect for certain educational credentials. Moreover, employers' preferences depend on the match between required and acquired skills, which are not constant across types of jobs. We observe that in Italy, for medium-high level jobs (technical jobs) in which the tasks are clearly defined, employers selecting from a pool of

job applicants do not necessarily opt for candidates with higher levels of schooling; rather, they prefer candidates with specific skills acquired either at school or through internships. Conversely, for medium-high level jobs in which job tasks are only broadly defined, having higher levels of education is one of the major considerations in hiring decisions, even though a lower level of education could be sufficient. This finding suggests that in certain institutional contexts such as in Italy, and for certain types of job, employers still prefer job candidates with specific and job-related skills over candidates with higher levels of general skills. This does not mean that general skills are irrelevant. We also observe that once job candidates meet the specific skills' requirement, employers opt for candidates with higher levels of job autonomy and problem-solving skills, which are expected to increase with higher levels of schooling. It means, however, that specific skills in some vocational subjects still matter for labour market outcomes, especially when job tasks are clearly defined.

In sum, we argue that the debate should not be between general and vocational skills, but that education and training systems should update their curriculum so as to meet both requirements, balancing the general and vocational components (Van de Werfhorst 2014). Furthermore, the payoff of educational credentials on the labour market depends on whether employers trust credentials as a reliable source of information. A way to enhance the signalling power of credentials could be to involve more employers in the definition of the curricula.

Besides generic and specific skills, other scholars point to the role played by transversal skills in labour market outcomes. Some scholars suggest that these skills are becoming increasingly important in contemporary labour markets (Dorfler and Van de Werfhorst 2009), others stress that these skills have always been important (Bowles and Gintis 2002), while it is also argued that the importance of these skills varies across types of job (De Wolf and Van der Velden 2001, Jackson et al. 2005, Jackson 2007). It is undoubted that the literature on returns on skills and credentials have increasingly considered transversal skills as important prerequisites for a successful transition into the labour market. Studies showing the extent to which this is actually the case are still scarce, in part due to the difficulty of operationalizing transversal skills in a meaningful way. In the vignette study, we contribute to this debate by investigating whether transversal skills enter into employers' hiring decisions and whether their importance varies across types of job. We did not find any clear evidence of their importance, especially in the experimental study. Employers involved in the survey, however, reported a moderate preference for candidates that meet desired personality traits, suggesting that there might be some personality traits and transversal skills that may enhance

occupational opportunities. We do not think, however, that the role played by transversal skills is overtaking the role played by formal education. For the largest majority of jobs, educational credentials and educational specializations still seem to be the major criteria for labour market success, especially at labour market entry. Bearing this in mind, other transversal skills and personality traits may indeed facilitate the process of school-to-work transition, but only when more formal educational requirements are met.

Besides the topic on returns on credentials and skills, the thesis has also considered two factors that are expected to influence the social stratification of labour market opportunities. At the aggregate level, scholars have documented how more differentiated educational systems generally show higher levels of inequality in educational opportunities, due to the selectivity of educational trajectories. Less attention, however, has been paid to the implications of more differentiated systems on inequality of occupational opportunities. This thesis shows that in more differentiated and vocationally specific systems, job matching patterns as well as being more efficient are also more equal. In other words, the gap between persons with different parental backgrounds in terms of probability of entering the labour market with a matched job is lower in more differentiated educational systems. The reason is that in countries with a strongly developed vocational system there is a clear transparency of the skills acquired at school and a labour market where employers are actively involved in the definition of the curriculum (Van de Werfhorst 2014). As a result, this leaves less scope for ascriptive characteristics such as social origin to influence labour market outcomes.

Further, we show that the moderating role of vocational specificity is stronger when associated with the tertiary school system compared to the secondary level. This result could be explained by the social selectivity of educational trajectories at the tertiary level. Previous studies have shown how students from underprivileged backgrounds are more likely to enrol in lower tier vocationally-oriented higher education programmes compared to students with an advantaged background (Schindler and Reimer 2011). Due to the vocational component of these programmes, a match between acquired and required skills should be more probable than for research-oriented university programmes, leading to a moderating effect which is stronger the more vocationally specific the training system is. At the secondary level, the distinction is between vocational and academic tracks. The latter, however, is meant to prepare for tertiary education and only a rather small proportion of students exit formal education at the secondary level with this qualification, especially in countries with a well-defined vocational training system.

Educational expansion calls for more diversification of educational offerings. It is not only the increasing number of graduates that calls for diversification, but also the increasing heterogeneity of the student population that enter higher education. What is at stake here, however, is that employers increasingly demand selection and excellence in order to be able to discriminate better between job applicants (Bills 2003, Van de Werfhorst 2014).

Diversification can take different forms, such as extending the tracking system to higher levels of education, providing the same training in more or less prestigious educational institutions (i.e. establishing highly selective programmes), differentiating students into different ability groups within the same educational institution (i.e. offering honour classes for the best students), or providing shorter and longer trajectories (i.e. Bachelor's and Master's degree). All of these forms of diversification may contribute in different ways to the formation of inequalities of both educational and occupational opportunities. If there is an ongoing trend toward diversification of the educational offer, it is important to understand which form of diversification is better in dealing with both functions of education –equal educational opportunities to all students and allocation to adequate jobs in a reasonable time.

Tracking could be a mechanism that reproduces educational inequality, but we show that it is still an efficient feature to guarantee equal opportunity in labour market entry, at least with regard to job matching processes. Other forms of diversification, such as stratified programmes in terms of quality and prestige, may contribute to the increase of both educational and occupational inequality, since students from different parental backgrounds would have the same credentials, but with a different labour market reward. However, if other processes of diversification also take place within the tracking system (selective programmes, honour classes, etc.), as some scholars suggest (Van de Werfhorst 2014), the aforementioned advantage of the tracking system over other forms of diversification would not hold.

By analysing processes of educational upgrading over an individual's life-course and the associated labour market premiums, we were also able to investigate whether this phenomenon influences the social stratification of labour market opportunities in Germany. The intergenerational mobility literature has often neglected educational attainment as a dynamic process, although the number of individuals who decide to undertake educational upgrading over the life-course is not negligible, at least in the German context. The association between social origin and occupational destination and the mediating role of educational attainment may therefore be altered, either reinforced or weakened, by processes of re-enrolment into formal education after labour market

entry. Considering both educational attainment and occupational progression over time clearly enriches our understanding of the formation process of occupational inequality. Despite the novelty of this approach for intergenerational mobility research, we do not observe initial disparities to be altered by processes of educational upgrading. In other words, the social stratification of labour market outcomes is already defined at labour market entry and despite the appreciable proportion of upgraders the initial gap does not change over the working life. In short, in highly differentiated educational systems, the stratification of educational trajectories is still the key determinant of the formation process of labour market inequality, at least for the stratification of occupational opportunities. Upgrading of educational credentials is a means to progress professionally, but it could also help to decrease other risks, such as skills obsolescence and unemployment. Since we could expect the risk of both skills obsolescence and unemployment to be greater among persons with a lower level of education, thus where underprivileged groups are more represented, upgrading of educational credentials could be a way to reduce these risks, especially for the most disadvantaged.

The selectivity of educational trajectories was the focus of the last chapter which moves the attention to the association between school segregation processes in secondary schools, where inequality in educational attainment generates, and school performance. Educational inequality does not only concern people of different social origins, but it also involves other personal characteristics such as immigration status. In line with previous literature, we also observe a strong unequal sorting process of students into educational trajectories, with immigrant students being more represented in lower tier educational programmes.

Higher concentration rates of non-native students within schools has often been seen as a problem for school performance due to language difficulties and cultural barriers. We do not find any substantive evidence that this is actually the case. In line with other studies, we only find negative ethnic concentration effects when a relatively high and empirically still rare proportion of non-native students is reached, thus in schools that most likely share other compositional characteristics. Negative effects regard especially students in the vocational branch, which could be the result of other unequal sorting processes characterizing students in vocational schools, such as social exclusion and behavioural problems.

In the remainder of this thesis the four empirical chapters previously discussed are presented individually.

2

Job-matching patterns in Europe: does the vocational specificity of the secondary and tertiary educational systems lead to more efficient and equal allocation processes?

Abstract

The chapter investigates the importance of the vocational specificity of the education and training system for school leavers' transition to a matched job. We disentangle features of the education and training system at the secondary and tertiary level assessing their importance for a more encompassing measure of educational (mis-) match combining vertical and horizontal matches. Empirical analysis bases on EU-LFS data for 22 European countries between 1995 and 2009, and estimates exploit variation in the institutional context between and within countries. Results suggest that at both levels transparency through the prevalence of vocational qualifications leads to more efficient and socially equitable transitions, lowering the disadvantage of the less privileged social classes in the job matching process. Nevertheless, we underline the overall limited contribution of contextual characteristics towards explaining individuals' variation in job-mismatch

Introduction

The characteristics of the education and training system have an important influence on employment opportunities and the transition process from school-to-work (Shavit and Müller 1998, Korpi et al. 2003, Scherer 2005, Breen 2005, Wolbers 2007, Andersen and Van de Werfhorst 2010). A major factor for assessing the importance of education and training system is the match between persons' formal qualification and their occupational position. In all European countries, the first job is decisive for the following career and having an "adequate" position right at the beginning is thus crucial for future chances. Most research focuses either on vertical mismatch, thus whether an individual is over-qualified for their job (Levels et al. 2014), or on the horizontal mismatch between the field of education and the type of occupation (Wolbers 2003, Levels et al. 2014). In both cases, the mismatch raises efficiency problems on the individual and societal levels, as the acquired skills, abilities and capacities are under-utilized. In order to provide a better understanding of mismatch we propose a combined measure of the two, which to the best of our knowledge has not been studied yet.

An ample literature identifies the vocational specificity as a crucial feature of the education and training system. In countries in which the education and training system (ETS) has a substantial vocational component school leavers have smother transitions into employment and find adequate jobs more easily. The reasons could be twofold. First, in countries with a well-established vocational system students enter the labour market with distinct qualifications, providing employers with clear and transparent signals of their skills (Andersen and Van de Werfhorst 2010). In these countries employers and trade unions have a large role in the design, update, and assessment of vocational programmes. Employers can thus rely on formal qualifications as a transparent signal of productivity because school leavers are specifically trained and have already been screened in terms of skills by the education system. Second, in countries with a well-established vocational system the job allocation process is more formalized and institutionalized due to the strong linkage between schools and companies (Marsden 1986, 1990, Van der Velden and Wolbers 2003, Anderson and Van de Werfhorst 2010).

However, most of these findings are based exclusively on features of secondary education and training systems. The implication of the tertiary educational system for the school-to-work transition have been rarely studied, notwithstanding educational expansion has made post-secondary and tertiary education increasingly important, and in the tertiary level system different features might be of major relevance. European countries differ substantially in their higher education systems, in the way students are

sorted into different tracks, trained and prepared for a profession, and consequently with regard to the skills and transparency of the degrees provided. We argue that in order to reach a better understanding of the importance of the aspects of the education and training system for the integration of young people into the labour market, the institutional structure of higher education needs to be investigated (Leuze 2010, 2011).

The way the education and training system is arranged may influence societal groups differently as it affects the information available to employers when candidates are being considered for a job. The tight nexus between education and labour market positions should also leave less room for other characteristics to determine the matching process, including social origin. Whether more equal matching patterns implies also more equal occupational opportunities depends on the nature of the mismatch among persons from different social backgrounds, though.

The paper contributes to the literature in several ways: first, we propose a combined measure of both horizontal and vertical mismatch to assess the importance of system characteristics on individuals' occupational outcomes on entering the labour market. Second, besides features of secondary education, we also include features of lower-tertiary and tertiary education. We investigate to what extent the vocational component of lower-tertiary and tertiary education system affects job allocation patterns beyond characteristics of secondary education systems. Third, we investigate the extent to which the allocation process of school leavers of less privileged social background are facilitated in countries that provide more transparent qualifications at the secondary and tertiary level. Finally, while most of the previous research focused exclusively on comparisons between countries, we also make use of the within country time dimension, controlling in this way for unobserved confounding country characteristics (te Grotenhuis et al. 2015) that might otherwise bias the assessment of the importance of ETS.

Job-match and the education and training system

Assigning workers to jobs is a two-side matching process including employers seeking and evaluating job applicants on the one side, and job seekers evaluating employers and job offers on the other (Bills 2003). The availability of information on the skills of candidates is a crucial element in this process and employers spend substantial amounts of money in advertising job positions and screening candidates in order to find appropriate candidates. The success of the process is then defined by the match between required and acquired skills (Sattinger 1993). A mismatch problem arises not

least due to incomplete information on the skills of school leavers (Spence 1973, Arrow 1973, Stiglitz 1975b, Logan 1996). Therefore, the clearer the information contained in formal qualifications - the more "transparent" they are – then the easier it should be to arrive at a satisfying match (Anderson and Van de Werfhorst 2010).

The relevant information contained in formal qualifications of school leavers, which depends on features of the education and training system, and especially the way in which professionally relevant training is provided, at secondary and tertiary level, affects how employers assess the skills of school leavers. European countries vary widely with regard to the specificity of qualifications provided by the educational system at both secondary and tertiary level and the importance attached to workplace-training (Shavit and Müller 1998, Müller and Gangl 2003, Breen 2005, Blossfeld et al. 2005, Wolbers 2003, Raffe 2008, Kogan et al. 2011, Levels et al. 2014, de Lange et al. 2014). Important aspects have been identified by previous research (Wolbers 2003, Van de Werfhorst 2004, Bol and Van de Werfhorst 2011). The differentiation of an ETS, but especially its vocational specificity, increases the transparency of qualifications. The literature refers to *vocational orientation* and *vocational specificity* to denote the extent to which educational systems provide vocational training for specific occupations. A country is vocationally oriented when a large proportion of students enrolled in upper secondary education pursue vocational tracks. On the other hand, a low enrolment rate in vocational schools indicates that a country tends to favour and to provide students with general skills, with occupation-related training being primarily obtained on the job.

Another aspect is whether the vocational programme is school-based, workplace-based, or combines both as is the case for apprenticeships. A strong on-the-job training component leads to smoother and more adequate transitions to employment. This is because highly specific skills can be transmitted and the training period can serve as a pre-screening, lowering the cost of selection and allocation afterwards. Training carried out at the workplace also helps students to acquire practical hard skills and experience as well as soft skills (problem solving, team-work, communication with customers), that are difficult to transmit in classrooms (Ryan 2011). Besides the training content, workplace-based training facilitates mutual information for employers and employees, increasing the transparency of qualifications.

More vocationally oriented ETS in which training takes also place at the workplace generally comes with more specific and directly useful skills. If vocational programmes specifically prepare students for well-defined occupations, the taught skills are more directly relevant to a specific occupation. Employers can then rely on such qualifications as informative signals of the skills needed by job candidates. Furthermore, in these

countries job allocation processes are more institutionalized since employers are often directly involved in the definition of the curricula. The way in which qualifications are structured in the education and training system and their subsequent use by employers, influences, at the system level, the relationship between qualifications and jobs (Bol and Van de Werfhorst 2011).

The literature has extensively documented the positive effects of the specificity of vocational skills taught in secondary education systems and several labour market outcomes, with the strength of the association depending on the specific labour market outcome. Countries with a well-developed vocational training system (especially apprenticeships) were shown to manage to reduce unemployment risks and the risk of unskilled employment (Shavit and Müller 1998, 2000), to speed up labour market entry (Breen 2005, Scherer 2005), to increase the chance to find a first job that matches the level of education and the field of study (Wolbers 2003, Levels et al. 2014), and to reduce the risk of entering the labour market with a temporary contract (de Lange et al. 2014). The aforementioned findings consider the vocational systems at the secondary level. Tertiary education, however, has become increasingly important and in response to educational expansion some countries introduced or enlarged the vocational component at higher levels (post-secondary and tertiary). Only few publications addresses whether the above mentioned findings with regard to secondary education are also applicable to higher education (i.e. Leuze 2007).

With the expansion of education and the changing nature of work in contemporary societies, participation in post-secondary and tertiary education has considerably increased. Technical change, globalization of production and markets and the consequent reduction of the manufacturing sector, the traditional sectors of vocational qualifications, led to increased demand for highly qualified workers in advanced economies (OECD 2013, Baethge and Wolter 2015). In several countries, higher non-university education with a clear vocational orientation is now available (Kirsch and Beernaert 2011). Besides lower-tertiary programmes, tertiary education in many European countries is organized in a binary system (Shavit et al. 2007): in addition to traditional, research oriented universities, students can opt for universities of applied sciences. Although the vocational component in the latter tends to be less specific than in short-cycle programmes, they are designed to train students for more or less specific occupations and generally include periods at the workplace. This increasing differentiation and the targeted vocational orientation of tertiary education suggests similar considerations on the transparency of the signals provided by educational qualifications as on the secondary level. However, it cannot be taken for granted, that the relevance of the features of the secondary level

are equally important for higher educational level of the ETS, neither that the findings from the 1980s and '90s still hold today. One might also argument that in the context of fast-changing economic situations, and especially for higher educational levels, vocational specificity should be less advantageous than educational systems that point more on general and transversal skill-formation (Hanushek et al. 2011, Allen and de Grip 2012, Van de Werfhorst 2014). We therefore extend the measure of the characteristic of the ETS from secondary to tertiary education and propose a measures of vocational specificity for both levels based on the size of the vocational component and its workplace training.

In sum, when educational qualifications are more specific and consequently often also more informative, either because the system offers a wider range of qualifications or because employers are directly involved in the training, the allocation of school leavers into the "right" job should be easier. As a result, the match between formal qualifications and occupational positions, considering both type and level, should be better in countries that have more vocationally specific qualification systems (*Hypothesis 1*). We argue that this is a generalized effect and not due to a composition effect of larger proportions of vocationally trained school leavers, though there might be even stronger benefits of vocational specificity for the vocationally trained compared to those entering the labour market with more general qualifications.

Implications for social inequality

School leavers' opportunities in the labour market are related to other characteristics and resources apart from education. Especially the social origin of an individual exerts an important influence on occupational opportunities even net of educational attainment (Blossfeld 1987, Kerckhoff 1995), not least as it comes with signals for specific (soft) skills and capacities (Bukodi and Goldthorpe 2012). Institutional factors, however, can weaken or strengthen the association between parental background and individuals' occupational opportunities (Brunello and Checchi 2007; Van de Werfhorst and Mijs 2010) and may thus contribute to equity in the society.

In educational systems where qualifications come with specific and clear information and are reliable signals of skills, i.e. those with a high vocational specificity (Bol and Van de Werfhorst 2011), educational credits play a major role in the allocation of individuals to jobs, making ascriptive characteristics- like social origin- less important. We therefore expect social origin to lose importance as the degree of vocational specificity at both secondary and tertiary level increases (*Hypothesis 2*). Whether having a match between

education and work leads to decreasing inequality in occupational opportunity depends on the nature of the mismatch among persons of different social backgrounds. Individuals that have a mismatch could be either employed in a better or in a worse job position than their level of education would suggest. If the probability of being over- and under-educated is socially stratified (i.e. persons from privileged parental background are more likely to be under-educated while persons from underprivileged background are more likely to be over-educated), then higher job matching patterns would reduce inequality in occupational opportunity by reducing both the risk of being over- and under-educated for the two social groups respectively.

However, there might be a downside to the increasing equality of occupational opportunity, net of educational attainment, expected for highly specific systems. ETS with high vocational specificity and well-defined vocational training at an early stage usually come with strong differentiation and rather early tracking, which has been found to increase social inequality of educational opportunities (Brunello and Checchi 2007, Van de Werfhorst and Mijs 2010). A reason for this is that parental background has a stronger effect on educational choices at a younger age than later in life (Mare 1980), but this problem should be less prominent when it comes to the specificity of higher level education

Data, design and measures

To properly assess the importance of ETS features on labour market outcomes and, in specific, the match of qualifications and job positions, the measure of both the characteristics of the ETS and the outcome are obviously crucial. Below, we propose some innovations for both. Empirical analysis employ data from the 2009 *ad hoc* module of the European Labour for Survey (EU-LFS) on school-to-work transition. This module combines information from the original labour for survey with more detailed information on transition from school to first employment of young adults aged 15-35 years old. More precisely, the dataset collects retrospective information on the first significant job (the first paid job lasting at least 3 months) after leaving formal education for the last time. We analyse 22 European countries for which we have reliable information at the micro and macro level. Due to lack of comparable macro data, we restrict our analyses to respondents who left formal education between 1995 and 2009. We further limit the analysis to respondents with at least an upper-secondary qualification. The mismatch measure we employ also includes the mismatch between fields of study and the skills

presumably required on the job, which can be applied only to individuals with at least an upper secondary qualification. After this adjustment and list-wise deletion of missing values we ended up with a sample of 81,067 individuals.

Specificity of the education and training system: extending measure to the tertiary level

We propose two indices able to capture the institutional components of ETS at secondary and tertiary levels for the 22 countries and implement them for each year between 1995 and 2009. European educational systems differ notably in their vocational specificity as well as over time (in the appendix, table 2.4 reports descriptive statistics on some of the macro variation, 2.5 reports the correlation among macro variables). At the upper-secondary level, we argue that vocational specificity is determined by (a) the degree of differentiation of the training offer and (b) the specificity of skills taught in vocationally oriented programmes. The first distinction is between school- and work-based programmes. The latter are programmes with a work/school ratio of at least 25 percent (OECD classification). A second distinction differentiates school-based vocational programmes according to the time spent doing practical training in firms. School-based vocational programmes in European countries may or may not provide students with some practical experience (Ryan 2011, European Commission 2012). In countries such as Slovenia, Bulgaria, Poland, Latvia, Estonia, Spain, Portugal, France, the Netherlands, Austria, Finland, school-based vocational training has a practical component ranging between 5 and 25 percent. In other countries, conversely, instruction takes place exclusively in the school environment. If part of the occupational advantage of vocational training is due to the work component, then these differences could be of relevant interest in comparative analyses.

The degree of differentiation is operationalized through the proportion of students enrolled in vocationally oriented tracks, while the specificity of skills taught in such programmes is operationalized through the proportion of the time students spend at the workplace in each vocational track. The final index combines these two dimensions. More precisely, we sum the proportion of students in each vocational track and we assign a "premium" to tracks that also provide workplace training as part of the curriculum (for more details on the operationalization of each indicator see Tables 2.6, 2.7, 2.8 in the Appendix). The size of the premium assigned to each programme will then depend on the proportion of time at the workplace and on the proportion of students involved in the study programme. Information on the proportion of students in vocationally-oriented tracks is derived from the annual OECD's Education at a glance report; while information

of the work/school ratio is derived from the report Apprenticeship supply in the Member States of the European Union (European Commission 2012).

While secondary level vocational training is provided in all European countries, at the tertiary level there is still a large cross-country variability with regard to the degree of differentiation. At present, European higher education systems can broadly be grouped into systems that provide educational alternatives to academic universities and those that do not (Shavit et al. 2007). However, within systems that provide alternatives there is also a large variability with respect to the distribution of students in different study programmes. Vocational specificity at the tertiary level is measured as the proportion of students in short-cycle programmes (ISCED 5B) and the proportion of students in university of applied sciences among students with an ISCED 5A. Both these types of study programmes are known to be more occupationally oriented compared to traditional research oriented universities.

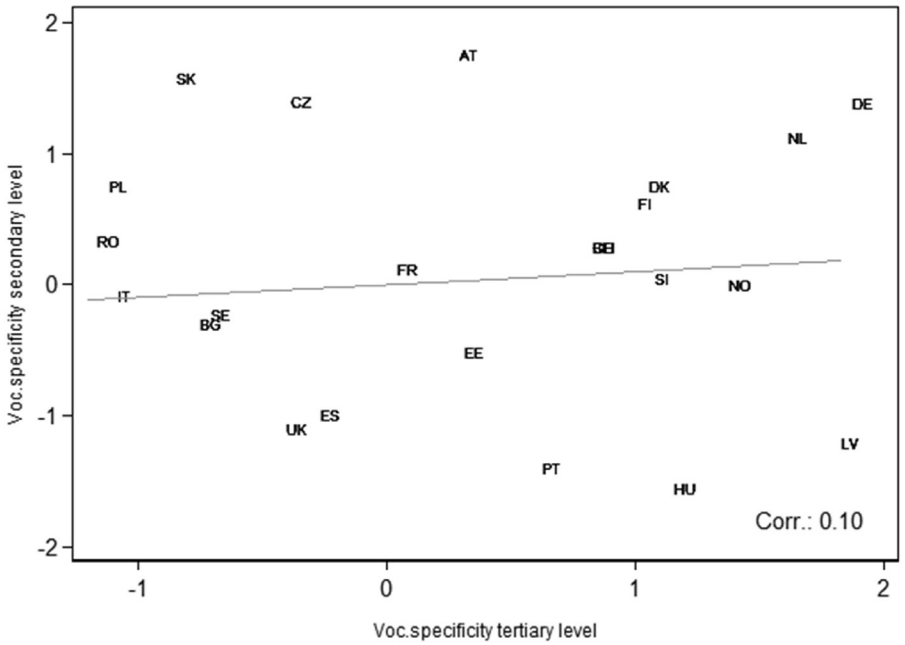


Figure 2.1 Association between vocational specificity at the secondary and tertiary level. Country mean of the period 1995-2009. For sources see text and tables in appendix.

Data on short-cycle programmes (ISCED 5B) comes from the UNESCO-OECD-EUROSTAT database; while data on university of applied sciences is derived from national statistical offices. Tables 2.9, 2.10, 2.11 in the Appendix report the details on tertiary education systems and on the operationalization of each indicator. Figure 2.1, based on the national mean values of the indices over the covered time span, reports the distribution of countries regarding the vocational specificity of the secondary and tertiary level education systems, showing only a very weak association between the two. This result underlines the necessity to provide a more encompassing understanding of the importance of features of the education and training system at both levels of education for the integration of young people into the labour market. Figure 2.7 in the Appendix provides the graphical representation of the between and within country variation in the two indices.

Job mismatch

The outcome of interest is job mismatch. The literature distinguishes between objective and subjective measures of job mismatch: the former uses measures such as the level and type of qualification attained and the educational requirements in order to perform the job properly (Pollmenn-Schult and Büchel 2004, Levels et al. 2014); the latter, instead, uses self-assessment indicators on the level of education needed to perform the job or indicators on whether the skills acquired in formal education are perceived to be over/underutilized (Barone and Ortiz 2011). We employ an objective measure of job mismatch following the operationalization proposed by Levels et al. (2014) and Wolbers (2003).

Levels and colleagues recognize two main types of mismatches: *vertical* and *horizontal*. The former refers to the discrepancies between the level of education and the level of skills required by the job. The latter refers to the discrepancies between the field of education and the field of occupation. In this chapter we combine both types in order to have an encompassing measure of job mismatch.

An occupation is considered as "vertically-matched" when the following two conditions are fulfilled: first, when individuals are employed in a job requiring a level of skill presumably acquired in formal education. In line with previous research, this is operationalized using ISCED levels of education and ISCO levels of skill (Levels et al. 2014). Respondents with an ISCED 3 and 4 working at jobs of one-digit ISCO 3 to 7 and respondents with an ISCED 5 and 6 working at jobs of one-digit ISCO 1 to 3 were coded as being vertically matched. The others were vertically mismatched. ISCO 3 is in both groups. These positions might match with either post-secondary (ISCED 4) or tertiary non-university programmes (ISCED 5B). Many countries do not provide vocational training

at the post-secondary and lower-tertiary level, so that a secondary qualification is often sufficient to access most occupations in the ISCO 3 group and more firm-related skills are acquired through on-the-job training. Vertical mismatch could indicate either persons that work in jobs that would require lower levels of education or persons that work in jobs that require higher levels of education. The latter group is marginal: only three percent of individuals turned out to be underqualified compared to 20 percent of persons being overqualified.

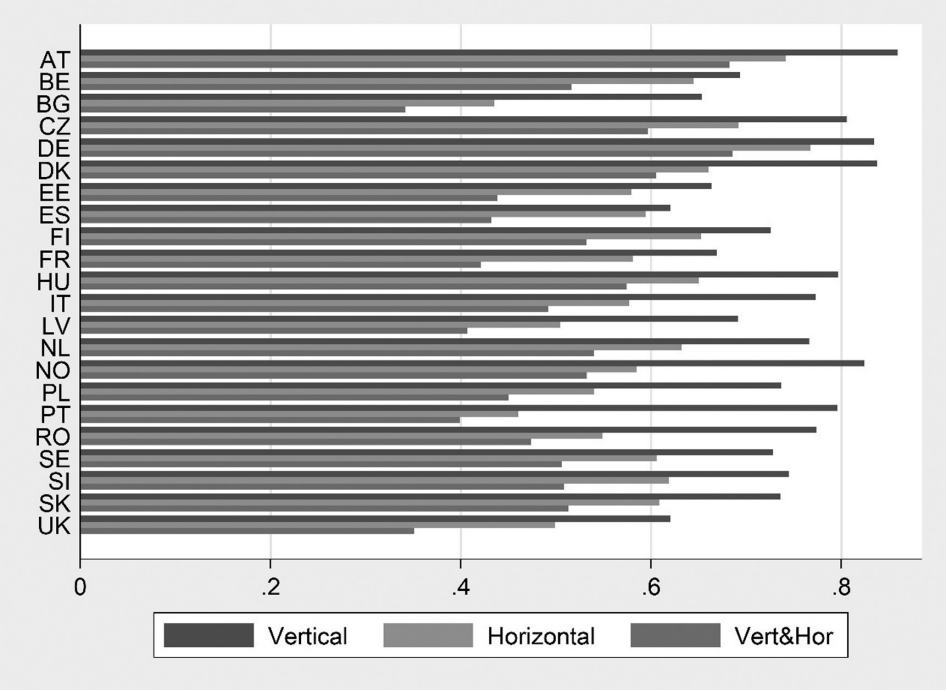


Figure 2.2: Proportion of individuals across types of job-match, by country. EU-LFS data 1995-2009, men and women aged 15-35 in their first significant job.

Second, a job is considered as "horizontally-matched" when individuals are employed in a job requiring the *type of skills* acquired in formal education. Following Wolbers (2003) and Levels et al. (2014) we use ISCED fields of study (nine categories) and the three-digit ISCO. Unfortunately, the EU-LFS does not provide more detailed information. Figure 2.2 shows the proportion of individuals with the first significant job either vertically or horizontally or both vertically and horizontally matched by country. On average, having a vertical job match is highly probable in all countries, with a probability always higher than 60 percent, while having a job horizontally matched is less probable; depending on the country the

probability ranges between 40 and 75 percent. If we restrict our measure to jobs that match both the level and the field of education, the probability of having a matched job decreases further. Since we are not interested in comparing vertical and horizontal mismatch, but rather in estimating the probability of entering the labour market with a job that satisfies the skills acquired in formal education, we restrict the analysis to the combined measure of job-match. Entering the labour market with a job that matches the field of study, but not the level of education required, implies a bad job allocation process since there is not a "perfect" match between required and acquired skills. Since categories are rather broad, an example is an engineer working as fire inspector or even as blaster. Similarly, entering the labour market with a job that matches the level of education, but not the field of study would still imply a loss of efficiency. An example is someone trained to be a teacher working as police inspector. We argue that in order to be considered successful, a job match should meet both conditions. We provide, however, results on the other two types of job-match in the Appendix.

Analytical strategy

In more recent years, the debate on how to model contextual characteristics on individual outcomes properly, received remarkable attention in the comparative sociological literature. Two papers, recently published in the European Sociological Review journal (Bryan and Jenkins 2015, Schmidt-Catran and Fairbrother 2015), show that a relatively large number of papers dealing with macro-micro effects employed inaccurate analytical strategies, although the two papers provide different conclusions and solutions with regard to the best strategy to be employed. Bryan and Jenkins show that analyses employing data with a large sample size within countries, but with a rather limited number of countries, lead to under-estimated standard errors for country-level coefficients. In order to get unbiased standard errors for multilevel linear models at least a sample size of 30 countries should be employed. They propose another strategy, the two-step approach. This strategy was shown to be less influenced by both the sample size at level-2 and the high number of observations within countries (Primo et al. 2007, Dieckhoff et al. 2015).

Schmidt-Catran and Fairbrother, instead, show that analyses employing multilevel models have often incorrectly taken into account the hierarchical structure of the date. The authors suggest that all levels that may influence an outcome variable must be properly specified in the model, otherwise standard errors for contextual effects would be downwardly biased. This incorrect specification applies mainly to studies that have both between and within-country over time variation. In this chapter, we do not

contribute to this debate, but since both approaches could be conceived as more recent methodological development in comparative analysis, we provide evidence employing both.

In the main text, we employ multilevel linear probability models specified as follow: individuals are nested within country-year, and country-year are nested within country. This specification correctly accounts for the structure of the data, reducing the risk of downward-biased standard errors for fixed effects, as highlighted by Schmidt-Catran and Fairbrother (2015). A two-step multilevel modelling approach is also employed as robustness check. In other words, individual-level regressions were run for each country-year separately (*Step 1*) and the estimated parameters used as dependent variables in country-panel regressions (*Step 2*) (results shown in Tables 2.16 and 2.17 in the Appendix). Results do not differ substantively between the two estimation strategies.

Most of comparative research analyses the effect of contextual characteristics on individual outcomes relaying only on between-country effects. This requires, however, a strong assumption on unobserved characteristics at the country level. With the increasing availability of contextual information, some scholars have proposed a different strategy that exploits both between-country and within-country variation separately (te Grotenhuis et al. 2015, Barbieri et al. 2016). In line with these studies, our strategy is then to employ hybrid models (Allison 2009). Two components of the effect of vocational specificity are considered: the first refers to the mean effect, which grasps the cross-country variation; the second component refers to the deviation from the mean, which grasps the within country over-time variation.

Results

Does vocational specificity lead to more efficient job-matching patters?

Table 2.1 displays results for the multilevel models. In Model 0 the intra-class correlation is estimated which informs about the extent to which the total variance in job-matching patterns is explained by characteristics associated with each level. The model demonstrates that both cross-country and cross-school leaving cohorts' variations are significant, yet very small. The contribution of contextual characteristics in explaining job-matching patterns is rather limited (jointly 4 percent), especially with regard to the within-country over-time variation, which is almost negligible.

Model 1 includes individual covariates. Compositional effects in terms of individual characteristics and resources explain 22 and 20 percent of the between and within variation in job matching patterns, respectively. Model 2 includes unemployment rate,

which controls for the general state of the economy in different countries and years. In line with expectations, entering the labour market under adverse economic conditions reduces the probability of having a first job that matches the qualification attained. This result holds also for the within country variation. This structural condition explains 6 percent of both the between and within country variation in job matching patterns.

Table 2.1 Multilevel linear probability models showing the effects of qualifications' transparency at the secondary and tertiary level on having the 1st job matched.

	M0	M1	M2	M3	M4	M5
Constant	.500	.351	.349	.344	.338	.347
Female (ref: male)		.049***	.049***	.049***	.049***	.049***
Level of education (ref: secondary general)						
- Secondary vocational		.169***	.169***	.168***	.168***	.175***
- Tertiary		.137***	.135***	.135***	.135***	.144***
Parents' level of education (ref: ISCED 2 or below)						
- ISCED 3-4		.013**	.013**	.013**	.012**	.010*
- ISCED 5-6		.042***	.041***	.041***	.040***	.041***
Unemployment rate			-.012**	-.012**	-.009*	-.010**
Voc. specif. sec. level				.035***	.032***	.019^
Voc. specif. tert. level					.028**	-.006
Voc. specif. sec* Educ. (ref: sec. general)						
- Sec. vocational						.018**
- Tertiary						.021**
Voc. specif. tert.* Educ. (ref: sec. general)						
- Sec. vocational						.053***
- Tertiary						.018**
Variance cnt level	.0086***	.0067***	.0062***	.0041**	.0032**	-
- ICC	3.5					
- Variance explained		22	28	52	68	
Variance cnt-year level	.00099***	.00079***	.00073***	.00071***	.00070**	-
- ICC	0.5					
- Variance explained		20	26	28	29	
Variance ind. Level	.2420	.2389	.2389	.2389	.2389	-
- ICC	96					
- Variance explained		.013	.013	.013	.013	
Likelihood-ratio test		.000	.005	.000	.010	

Source: EU-LFS 2009. *** p<.001, ** p<.01, * p<.05. Macro variables are standardized. *N*:81067; *N* country-year:330; *N* countries: 22. Models 1 to 5 control for age.

In order to estimate the contribution of features of the secondary and tertiary education system we employ a two-step approach. Model 3 includes vocational specificity at the secondary level, which explains 24 and 2 percent, respectively, of the between and within country variation in job matching patterns. Model 4 includes both features of education and training system. Vocational specificity at the tertiary level alone explains 12 percent and 1 percent, respectively, of the between-country and within-country variation. Both indexes have a positive effect on job-matching patterns.

We hypothesized that the effect of vocational specificity is a generalized effect and not due to a composition effect of larger shares of vocationally trained students. This is tested by including an interaction effect between the two indices and individuals' education (Model 5). At both the secondary and tertiary level vocational specificity has a stronger positive effect on vocationally trained students and on students with a tertiary degree. Vocational specificity at the secondary level is beneficial even to generally educated school leavers from the secondary level, but to a very small extent, while specificity at the tertiary level does not help them to enter the labour market through a matched job, but does neither come with a penalty for them. Overall, the expectation that vocational specificity has a generalized positive effect is only partially supported.

Basing the estimation strategy of the education-system effects (prevalently) on between country variation might be problematic and is reasonable affected by confounders not controlled for in the model, which in this case likely include the structure of the labour market or the general aspects of the nations' economic system (note that we control for business cycle). To put our results on a more solid ground, Table 2.2 shows results disentangling the effect of the two indices in the between and within component.[1] The within-estimate is not affected by unobserved heterogeneity at the country level. The index at the secondary level turned out to be significant only when associated with cross-country differences in job matching patterns. More precisely, the probability of being employed in a first matched job is 17 percentage points lower in countries with a low degree of qualifications transparency at the secondary level than in countries with high degree. The index at the tertiary level improved matching significantly when associated with both between-country and between-school leavers' cohorts variation. The difference in the probability of entering the labour market with a matched job in countries with low and high degree of vocational specificity at the tertiary level is 8.5 percentage points. Within-country effects exploiting the yearly variation (based on the year of school-leaving) shows that a high degree of vocational specificity of the tertiary

1 Due to sample size constraints, it is not possible to differentiate these effects by individuals' education.

level increases the probability of having the first job matched by 4.4 percentage points with respect to a low level of specificity.

Table 2.2 Multilevel linear probability models showing the effects of vocational specificity at the secondary and tertiary level on having the 1st job matched, exploiting both the between- and within-country component.

	Model 6
Constant	.338
Voc. specificity sec. level (country mean)	.051***
Voc. specificity sec. level (yearly deviation)	.017
Voc. specificity tert. level (country mean)	.028*
Voc. specificity tert. level (yearly deviation)	.030*
Variance country level	.0028
Variance country-year level	.0007
Variance individual level	.2389
N	81067

Source: EU-LFS 2009. *** p<.001, ** p<.01, * p<.05. The two indices are standardized.

Results hold also when a two-step multilevel modelling approach is adopted (see tables in Appendix). To capture aspects of the education and training system and not merely expansion of the tertiary sector, we also ran models including the proportion of tertiary graduates at specific country-year points and found that the results hold (results shown in Table 2.12 in the Appendix). The effect of the two indices varies depending of the specification of job mismatch. Vocational specificity influences more the probability of finding a horizontally matched job compared to a job which is vertically matched. The effect, though, is even stronger when the combined measure of job mismatch is employed. This seems to indicate that the degree of vocational specificity reduces efficiency problems, at both individual and societal levels, by allocating school leavers to the "right" job (cf. Table 2.14 in the Appendix).

In sum, there is some evidence showing a positive effect of vocational specificity at both levels of education on school leavers' probability of entering the labour market with a matched job. By exploiting the between-country and within-country variation, we were able to disentangle the association between vocational specificity at both levels of education and school leavers probability to end up in a matched job. It is important to bear in mind, however, that the variation in job matching patterns is almost entirely determined by individual-level characteristics rather than contextual determinants. The contribution of features of the training system as well as other contextual characteristics in explaining the overall variance in job-mismatching is thus very limited.

Does vocational specificity lead to more equal job matching patterns?

The previous section showed the association between models of vocational systems and job matching patterns in a multivariate analysis. Institutional aspects of the ETS, however, may influence social groups differently. The organization of the education and training system determines, among other things, the distribution of qualifications within a society and the way employers rely on formal education for hiring purposes. We argued that if employers can rely on qualifications as transparent signals of skills and productivity, they will be more prone to use formal education criteria during the recruitment process rather than relying on other signals related to parental background. We expect that the differences in the probability of having the matched first job across parental-background groups should vary across countries and that part of this cross-country variation can be explained by vocational specificity at both levels of education.

Figure 2.3 displays the difference in the probability of entering the labour market with a matched job between school leavers with highly educated parents and school leavers with less well educated parents. In almost all countries persons with low educated parents face higher risks of having a mismatch. Between-country variability is relatively large, though. The countries that show the largest gap are Romania and Bulgaria. Table 2.3 presents results from the multilevel analysis. Since we are unable to estimate the within effect due to the small sample size of persons with low, medium, and high educated parents within each country-year cell, the following analysis focuses on the overall effect of our macro variables.

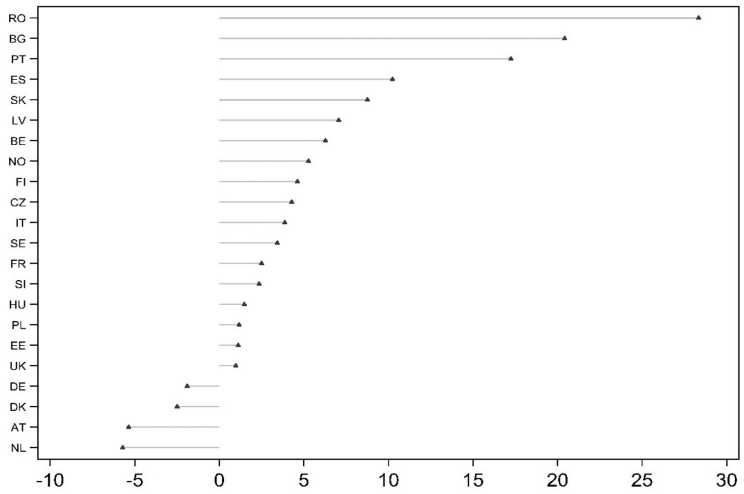


Figure 2.3: Difference in the probability of having the first job matched between school leavers with parents with high (ISCED 5/6) and low (ISCED 2 or below) levels of education, by countries

Table 2.3 Multilevel linear probability models showing the effect of vocational specificity at the secondary and tertiary level on having the first job matched among different social origin groups.

	Model 7	Model 8	Model 9
Constant	.399	.339	.398
Parents' education (ref: ISCED 2 or below)			
- ISCED 3-4	.020*	.019*	.020**
- ISCED 5-6	.060***	.056***	.064***
Voc. spec. sec. level	.029***	.032**	.032***
Voc. spec. tert. Level	.025**	.026**	.034*
Voc. spec. ec. lsevel * Parents' education (ref: ISCED 2 or below)			
- ISCED 3-4		.000	.001
- ISCED 5-6		-.009	-.010
Voc. spec. trert. level * Parents' education (ref: ISCED 2 or below)			
- ISCED 3-4			.003
- ISCED 5-6			-.031**
Random slopes (country level)			
Variance parents' edu. (ref. ISCED 2 or below)			
- ISCED 3-4	.0011*	.0011*	.0011*
- ISCED 5-6	.0042**	.0039**	.0025**
Explained variance			
- ISCED 3-4		0	0
- ISCED 5-6		7	41
Likelihood ratio test		0.733	0.000

Source: EU-LFS 2009. *** p<0.001, ** p<0.01, * p<0.05.
Notes: Macro variables are standardized. *N*:81067; *N* country-year:330; *N* countries: 22. Models are net of: gender, age, level and orientation of education, unemployment rate. The covariance between parental background groups is not shown.

Model 7 includes parents' education as random slope at the country level. The variability we observed in Figure 2.3 turns out to be significant, which shows that the occupational opportunities of different social origin groups are not constant across countries. As a robustness check of the results we rerun the analysis excluding Romania and Bulgaria, which show the largest variability in job matching patterns between social groups. Excluding these countries reduces the variability between the three groups, but the variation remains significant.

Model 8 includes the cross-level interaction between parents' level of education and vocational specificity at the secondary level. The latter explains 7 percent of the cross-country variability between having parents with a low level of education and parents with a high level of education, but it does not explain any variation between

those having parents with low and parents with a medium level of education. This interaction, however, does not improve the model significantly. Model 9 includes the cross-level interaction between parents' level of education and vocational specificity at the tertiary level. Models of vocational skills supply at the tertiary level do not explain any cross-country variability between having low and medium educated parents; while it explains 34 percent of the variability between having low and high educated parents. More precisely, only persons of disadvantaged origin benefit from a more vocationally specific system at the tertiary level.

Figure 2.4 shows the slope for school leavers with parents with a high level of education and parents with a low level of education. In the left-hand box, results for the index at the secondary level are shown. Both groups have a positive slope and we do not observe any difference with regard to the probability of having the first job matched, except for a slightly steeper slope for those with parents with a low level of education. The right-hand box shows results for the index at the tertiary level. The gap between the two groups is statistically significant when vocational specificity is below the mean value. No differences between the two groups are observed at the highest extreme of the distribution. Unfortunately, we do not have information on the type of programme attended by respondents from different social backgrounds. From previous studies we know, however, that the distribution of students across different programmes is socially stratified (Schindler and Reimer 2011). Disadvantaged persons are more likely to enrol in vocationally oriented programmes compared to persons of advantaged backgrounds. This is true also for the tertiary level. The stronger positive effect we observe among the disadvantage group could thus be the result of this uneven distribution across programme types. Nevertheless, in terms of job-matching opportunities our result clearly show that higher vocational specificity at the tertiary level reduces significantly the gap between persons of different parental backgrounds, although this may come with larger inequality in educational opportunity.

As mentioned above, whether a more efficient and equal allocation of school leavers to jobs leads also to a reduction of social stratification processes in labour market opportunities depends on the nature of the mismatch among persons of different social backgrounds. As is shown in Figure 2.5 persons with low educated parents face, on average, a higher risk of being overeducated compared to persons with high educated parents. The difference is more accentuated among holders of higher education degrees. On the contrary, persons with highly educated parents have a higher probability of being employed in jobs that would require higher levels of education as compared to persons

with low educated parents. Note that only school leavers with an upper secondary qualification can experience undereducation and this group is relative small. This picture leads to the conclusion that more vocationally specific education and training systems may also reduce the social stratification in job allocation processes by reducing the probability of being overeducated for the underprivileged group. Interestingly, and in contrast to some of the arguments sustaining the importance of general training in the course of fast changing markets, especially the vocational components of the tertiary education-system come with an advantage for those labour market entrants from less advantaged social backgrounds.

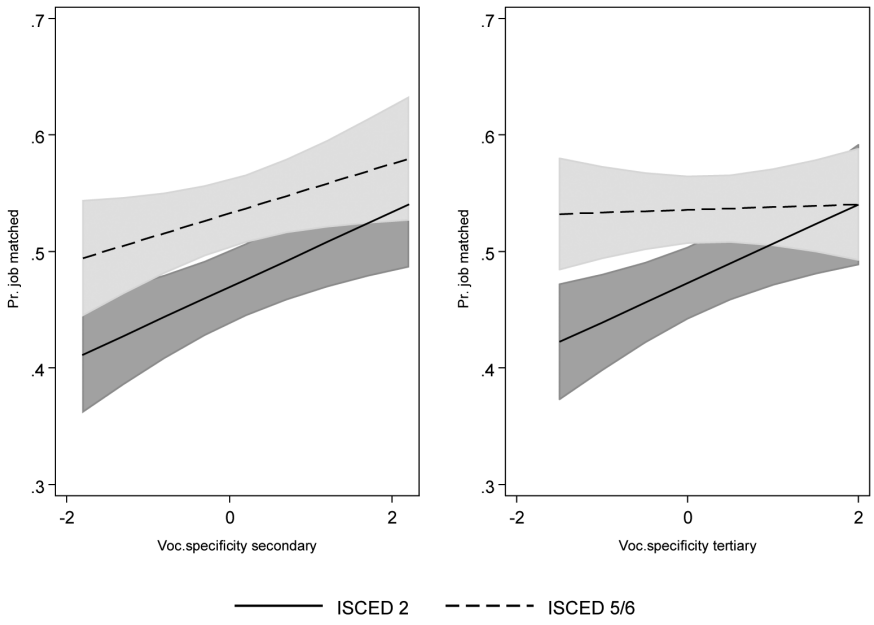


Figure 2.4: Cross-level interaction effects between vocational specificity at the secondary and tertiary level and parents' level of education on the probability of having the first job matched. Interactions are shown only for persons with low (ISCED 2) and high educated (ISCED 5/6) parents

Conclusion and discussion

We investigated the chance to find a (horizontally and vertically) matched job at labour market entry in 22 European countries between 1995 and 2009. Specifically, we assessed the importance of features of the education and training system, namely its vocational specificity and its change over time. Where the educational system comes with a differentiated and well-developed vocational component, especially when work-place-based, education becomes a clear signal for qualifications and skills of school leavers. This eases the appointment to adequate jobs, especially at labour market entry. Employers can rely on formal education to a larger extent, making other information, like social origin, less important in the recruiting process. Following these arguments, we expected more efficient and equal transitions patterns in countries in which qualifications are more specific.

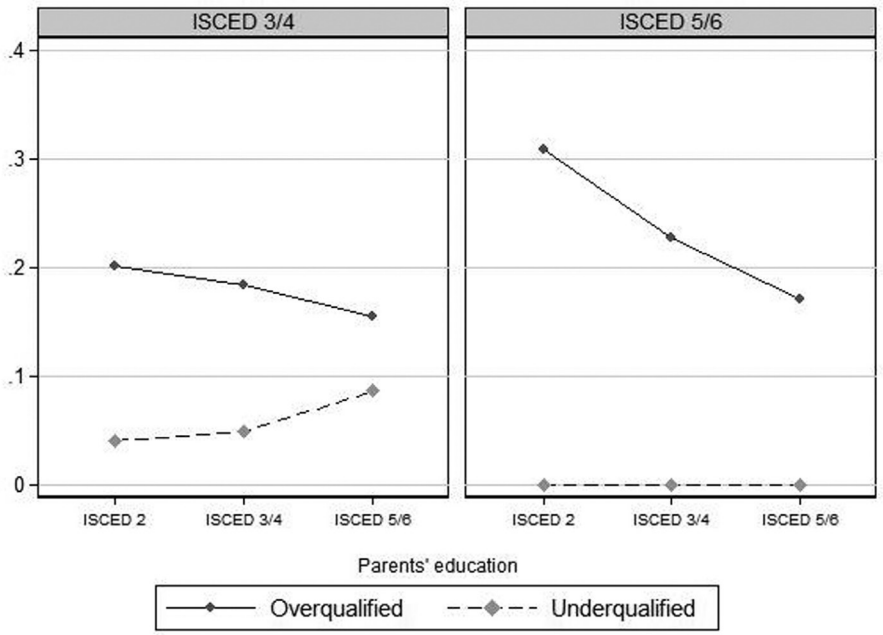


Figure 2.5: Over- and underqualification by social class of origin: persons with low (ISCED 2), medium (ISCED 3/4) and high (ISCED 5/6) educated parents.

Previous literature classified educational systems almost exclusively on the basis of the secondary level. Countries, however, also differ considerably in the organization of tertiary education, which becomes increasing important with the ongoing educational expansion, and not necessarily the organization of the two levels is related. We therefore distinguished vocational specificity at the secondary and the tertiary level.

We found clear evidence for a positive association between the specificity of qualifications at the secondary and at the tertiary level and school leavers' probability to enter the labour market with a matched job. The specificity of educational qualifications on the two levels exert independent effects and the extension to the tertiary level therefore clearly enriches our understanding of relevant features of the education and training system for the school-to-work transition.

Empirical estimates exploit between-country and within-country variation of vocational specificity. Despite the limited period we investigated, there is substantive within country variation in the prevalence of different study programmes at the two levels, and results are also robust when based on the within country variation only. This puts the empirical finding on a much more solid ground compared to previous studies focusing prevalently on country comparisons. Furthermore, results also hold when controlling the overall economic situation and the extent of educational expansion.

As a second main contribution, we showed a slightly stronger association between vocational specificity and the chance to find a first matched job among those from a less privileged social background compared to those from more privileged origins. The specificity of the educational offer can therefore reduce the social gap in finding a fitting job. This leads to more equity in occupational opportunity since persons with low educated parents have comparatively higher probability to experience negative mismatch (undereducation) compared to persons with high educated parents. These results hold notwithstanding there might be a certain trade-off between inequality in educational opportunities and the reduced relevance of social origin in the job matching process.

Overall we showed that strengthening the specificity of qualifications by increasing differentiation and the work-based-training component at the secondary and tertiary level increases the linkage between the qualifications and the occupational outcome (Andersen and Van de Werfhorst 2010), which leads to more efficient and socially equitable allocation of jobs.

Notwithstanding this clear contribution, we want to add a note of caution for further research dealing with these macro-micro associations. In order to derive policy implications, it is necessary to consider not only the strength of the associations but also the contribution of the contextual characteristics in explaining the overall variation in

the outcome. Previous research has mainly concentrated on the association between country level contextual characteristics (such as the education and training system) and various individual-level labour market outcomes. Little or no attention has previously been given to the explanatory power, i.e. whether the variation in the outcome variable due to contextual determinants was sufficiently large to draw meaningful conclusion about its importance for the outcome. In line with a recent publication by Barbieri, Cutuli and Passaretta (2016), we found that a rather small portion of the total variance is associated with contextual characteristics. The two macro indexes explain only a limited portion of the total variance in individuals job-matches. This does not mean the context would be irrelevant, but suggests that features of the education and training system do not contribute substantively to the overall outcome, despite the significant and not weak effects. We encourage further research on the importance of macro effects for micro outcomes to address this issue empirically in order to have a better understanding of the real contribution of single contextual determinants in explaining variation in micro characteristics.

Appendix

Table 2.4: Descriptive statistics: macro variables

Vocational specificity secondary level	**Min/max**	**Mean**	**SD**
Not-standardized index	25.4/115	64.8	22
Standardized index	-1.76/2.24	0	1
Vocational specificity tertiary level			
Not standardized index	0/79.4	29.5	24.4
Standardized index	-1.21/2.04	0	1
Unemployment rate			
Not standardized	2.5/20.7	8.7	3.7
Standardized	-1.58/3.31	0	1
Tertiary share			
Not standardized	6.9/37.3	19.9	8.1
Standardized	-1.60/2.13	0	1
EPL (temporary)			
Not standardized	.25/4.75	1.80	1.15
Standardized	-1.35/2.55	0	1

Table 2.5: Correlation matrix: macro-level variables (standardized values)

	Unemployment	**EPL-temporary**	**Tertiary ratio**	**Voc. sec.**	**Voc. tert.**
Unemployment	1				
EPL-temporary	0.26	1			
Tertiary ratio	-0.31	-0.15	1		
Voc. spec. sec.	-0.09	-0.12	-0.08	1	
Voc. spec. tert.	-0.39	-0.19	-0.47	0.10	1

Table 2.6: Percentage of individuals in dual system programmes over the period 1995-2009, by country. The last column shows the work/school ratio.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Premium Work/ School ratio
AT	34	34	34.5	34.9	35.8	36.4	35.8	34.7	33.6	32.7	33	34.3	35	35.9	34	.80
BE	3	3	3.5	4	4	2.8	2.5	2.5	3.4	2.6	3.3	3.5	3.4	3.2	1.8	.60
BG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZ	33.4	47	33.4	33.4	40	40.5	37.9	38.2	37.2	36.2	35.5	34.8	34	33.1	32.2	.40
DE	49.1	52	49.1	49.1	48.7	48.2	51.2	50.8	49	47	45	44.2	42.2	42.8	45.3	.70
DK	48	48	50	51.3	52.5	54.1	53.5	53	53.3	46.1	47.7	47.6	47.2	47.5	46.5	.66
EE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FI	10.5	5	10.5	10.5	10.6	10.7	10.3	10.8	10.9	11.2	10.5	10.9	11.5	13.4	14.7	.75
FR	11.2	11.2	11.2	11.2	11.5	11.7	12	11.8	11.2	11.4	11.3	11.6	12.1	12.4	12.4	.66
HU	8.6	8.6	8.6	8.6	11	10.3	11.5	12.8	12.8	12.1	13.2	12.9	13.2	13.9	14.5	.60
IT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NL	19.7	23	19.7	19.7	20.1	20.4	21.9	23.5	23.6	22.9	20	18.3	18.5	20.2	21.5	.60
NO	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.9	14.9	15.5	16.6	.50
PL	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.3	6.4	5.5	6.3	.60
PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SK	40.3	40.3	40.3	40.3	40.3	39.7	42.5	41.3	38.9	37.2	31.7	30.9	29.9	28.6	27.8	.60
UK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7: Proportion of students in the first school-based vocational training over the period 1995-2009, by country. The last column shows the work/school ratio.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Premium Work/ School ratio
AT	42	42	42	35	35	34	35	37	38	39	39	38.8	37	35.8	35	.10
BE	65	65	65	65	65	64	65	67	65	65.2	65	66	67	69	69	0
BG	55	55	55	55	55	55	55	54	54	55	54	53	53	51	50	.065
CZ	37	37	46	46	46	40	41	42	42	43	44	44	43	41	41	.05
DE	24	24	15	15	15	14	14	14.2	15	15.2	15	15	15	15	15	0
DK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EE	43	43	43	43	43	43	43	43	40	41	42	42	42	43	44	.25
ES	37	37	21.5	21.5	31.2	28	30	33	34	35	42.6	42.5	42.5	43.8	43	.21
FI	47	47	44	41.5	37	44	45	46	50	50	53	54	54	54	54	.21
FR	43	43	43	44	44	45	45	45.5	46	46	45	32	32	32	32	.165
HU	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	10.9	10.7	10.5	10.5	10.5	0
IT	63.6	63.6	63.6	63.6	63	63	64	64.8	63	62.8	62	61.4	60	59.4	59	0
LV	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	.15
NL	46	46	46	46	46	48	46	46	46	46	48	50	48	47	47	.20
NO	41	41	41	41	42	44	44	44	47	47	47	46	43	40	40	0
PL	64	64	64	64	71	71	71	69	63	58	54.5	53.9	54	56	57	.15
PT	58	7	7	7	7.5	8	9	10.6	11	11.5	12.2	13	17	24	29	.15
RO	72	72	72	72	72	72	72	72	72	72	72	72	72	72	71	0
SE	51	51	40.6	47.3	48.8	51.7	49.6	52.9	53.4	52.7	52.7	52.7	52.7	52.7	52.7	.15
SI	24	24	24	24	24	24	23	21	20	19	18	16.5	16	15	14.5	.20
SK	39.3	39.3	39.3	39.3	39.3	37	47	35	36	37	42	42.7	43	44	44	0
UK	41	41	41	41	41	41	41	41	41	41	41	41	41.4	31.4	32	0

Table 2.8: Proportion of students in the second school-based vocational training over the period 1995-2009, by country. The last column shows the work/school ratio.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Premium Work/ School ratio
AT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LV	32	32	32	32	32	32	32	32	32	31	29	28	28	29	30	0
NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PT	0	18.5	18.5	20.6	20	20	19.5	18.6	18	18	20	20	15	8	6	0
RO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SI	40	40	40	40	40	40	39	39	39	40	40	41	42	42	43	.025
SK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.9: Proportion of students in short-cycle programmes over the period 1995-2009, by country.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AT	33	33	33	33	33	29.6	29.8	28	28.4	24	23.5	21.8	21.5	20	21.4
BE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DE	33.7	33.7	33.7	33.7	33.4	32.3	33.2	32	32.3	31.3	30.2	29.1	26.3	24.4	28.9
DK	18	15.6	16.3	18	15.6	16.3	16.8	16.5	16.2	12.1	10.6	10.8	11.2	12	12.5
EE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ES	11.2	11.2	11.2	11.2	13.5	17.9	21.6	24.9	27.6	29.4	29.3	29.1	28.5	27.6	27.5
FI	38	27	15	7.3	2.3	1.6	.4	0	0	0	0	0	0	0	0
FR	27.1	27.1	27.1	27.1	27.5	28.1	28.1	28.7	29.5	30.5	30.5	31.4	32.8	32.7	33.5
HU	0	0	0	0	0	1	2	3	4.8	7	7	8.8	9.1	9.8	9.9
IT	2.7	2.7	2.7	2.7	2.2	3	2.7	3	1	1	1.6	1.5	1.3	1	1.5
LV	10.7	10.7	10.7	10.7	8.9	11.4	10.4	14.4	14.5	14.6	15.9	12	14.3	19	17
NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NO	11.9	11.9	11.9	11.9	12.6	12.7	10.1	9.7	8.5	5.1	3.3	2.1	1.7	1.3	1.1
PL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PT	0	0	0	0	0	0	0	0	0	0	0	.3	1	2.1	2.6
RO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SI	38	37	38.9	34.7	30	16.4	12.2	14	9	12.3	14.7	16.5	17.2	19.9	17.5
SK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.10: Proportion of students in university of applied sciences over the period 1995-2009, by country.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AT	0	0	0	0	0	0	0	0	0	12.6	16.7	19	22.5	23.4	24.4
BE	52.4	52.4	52.4	52.4	51.7	51.6	51.7	51.8	50.4	50.6	50	47.4	39.5	39	40.4
BG	11	11	11	11	11	11	10	9.3	7.5	8.4	8.8	10.5	10.4	10.1	11.7
CZ	27.4	27.4	27.4	27.4	30.4	22	20	18.6	13	13.6	14.2	11.5	8.6	8	6.2
DE	44.2	43.7	43.7	43.7	44.1	43.5	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7
DK	41.8	48.9	49.4	49.6	49.7	49.7	48	44	44.3	41.7	41	39.3	36.5	36.5	35.7
EE	13.7	23	28	27	32.4	36	43	45.4	45.6	44.7	37	37.4	36.2	34.6	36.5
ES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FI	9.9	23.4	28.5	31.8	39	50	56.7	58.5	57.8	57.9	57.8	56	53	53	51.3
FR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HU	53.4	53.4	53.4	53.4	53.4	53.4	53.4	52.5	50.2	51.8	53.9	52.6	52	52.3	52.3
IT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LV	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	62.2	61.6	60.2	62.4
NL	63.1	63.1	62.7	67.6	69.1	70.8	71	70.9	70.9	70.2	68	66.2	65.4	67.7	67.4
NO	53.3	53.3	53.3	53.3	53.7	53.7	58.3	58.3	56.4	59.1	63.4	58	53.1	53	47
PL	2	2	2	2	1.8	0	1.1	1	1.1	1.2	1.2	1.2	1.2	1.2	1.1
PT	35.1	35.1	36	37	41.4	44.2	48.1	48.3	48.5	47.5	48.2	46.6	44.6	43.2	36.2
RO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	5.1	9.5	11.9	10.6	9.6	9.4	9.7	10.8	12.1	14.8	17.1	18.4
SI	0	2.5	6.7	17.8	27.4	38.8	42.9	42.2	45.3	44.9	43.9	41.5	41.9	41.4	38.9
SK	11.2	11.2	11.2	11.2	11.2	9.3	8.2	9	6.8	8	5.3	2.6	1.7	1.2	.8

Table 2.11: Technical notes on higher education systems, by country

Country	Notes
AT	The proportion of students enrolled in UAS in Austria is rather small for two reasons: first, Austria established UAS in the academic year 1994/1995. This means that the first graduates exit this programme in the academic year 1998/1999; however, they were only few. Second, we do not have reliable information prior 2002, in which the graduation rate was still below 10 percent. Starting from 2003 onwards the graduation rate in USA increases, while graduation from ISCED 5B programmes declined. The proportion of students in ISCED 5B is derived from UOE (UNESCO-OECD-EUROSTAT) statistics (to see which programmes are classified as ISCED 5B by UOE see ISCED MAPPING). Information on UAS is derived from Austrian statistical office. Unfortunately, information is available only from 2003.
BE	The Flemish community of Belgium has a higher education system similar to the Dutch one. It has a binary system. Higher education is provided in professional and academic programmes. The system was reformed in 2003 to comply with the Bologna Process. In ISCED 97, professional study programmes are classified as ISCED 5B, while in the 2011 version they have been upgraded to ISCED 5A. In this classification they are treated as UAS. Official data from national statistical office are available from the academic year 2005-2006. Data on former years (1998-2005) are derived from Eurostat, the others (1995-1997) are imputed. It was possible to use the Eurostat database since professional study programmes are classified as ISCED 5B and there are not, such as in the Netherlands, short-cycle programmes (<3 years).
BG	Bulgarian higher education is divided in two main branches: universities and professional universities. The second lasts 3 years and prepare students for the labour market. Students with a professional university degree can enter a master's degree at universities (the degree differs from more traditional bachelor's degree). This programme was classified as UAS. Data are derived from the national statistical institute.
CZ	The Czech Republic has a sort of binary system with professional schools and universities. Depending on the programme, the former may last between 2 and 3.5 years, however, only few students are enrolled in programmes that last less than 3 years (see ISCED MAPPING). While the overall graduation rate in professional schools remained unchanged, university attendance increased over time considerably. We have used UOE data on graduates from ISCED 5B. Data prior to 1998 were imputed.
DE	Germany has a well-established binary system. Data on university and *Fachhochschule* graduation rate, however, are available only until 2002. The reason is that after the Bologna process also the structure of *Fachhochschule* was adapted to the new reform (3+2) and it is not possible to disentangle the two types of higher education programmes. The distribution of graduates, however, did not change substantially over time, therefore the bias should not be large. *Fachhochschule* for the teaching profession was treated as UAS. Data are derived from the federal statistical institute.
DK	The Danish higher education system provides the following programmes: (1) academy professional degree held in University College or in academy of professional higher education. It lasts 2 years. (2) Professional bachelor's degree held in University College or in Academy of professional higher education. It lasts between 3 to 4 years. (3) University bachelor's degree held in traditional universities. It lasts 3 years. (4) Master's degree that lasts 2 years. Data are derived from the national statistical institute.

Table 2.11: Continued

Country	Notes
EE	Estonian's higher education has two main branches: academic and professional higher education. The latter lasts 3 years and allows students to apply for a Master's programme. Professional higher education institutions do not provide master's programmes themselves. Data derived from the national statistical institute.
ES	The Spanish higher education system offers two year higher vocational programmes, provided by different institutions which are subjected to the same minimum requirements. Data are derived from UOE database.
FI	Finland higher education system has a binary structure. There are universities and polytechnics. The latter provides training only in certain subjects. Data derived from the national statistical institute.
FR	In the French higher education there are some vocational options mainly lasting between 2 and 3 years and provided by different institutions. The system, however, cannot be classified as binary since there is not a clear distinction between universities and UAS. Data on ISCED 5B is derived from UOE database.
HU	Prior to the Bologna reform in 2005, Hungary had two types of higher education institutions: colleges (Foiskola) that lasted 4 years, and universities (Egyetem) that lasted between 4 and 5 years depending of the subject. The bologna reform in 2005 has weakened the distinction between these two types of institutions. Data derived from the national statistical institute.
IT	Italy has a unified higher education system.
LV	Latvia has established a binary system in 1991. In line with other European countries, two types of higher education institutions were introduced: academic and professional higher education. This distinction was further stressed in the 1995 reform, while after the Bologna reform the legal division became weaker. We managed to collect data only from 2005. According to several reports, when the distinction between academic and professional higher education was introduced, the academic track was more attractive (especially in the first years). In the data we have, thus starting from 2005, graduates from the professional track are around 60 percent. The increase seems to be due to the Bologna reform that has weakened the distinction between the two educational tiers. Indeed, after the Bologna reform the 3+2 structure was introduced also for the professional branch, reducing the distinction, in terms of status, between the two educational institutions. Therefore, the imputation could have led to overestimated proportions. Models were run also excluding Latvia. Results do not change.
NL	The Netherlands has a clear-cut binary system. We derived data from the Dutch statistical institute. We have information on graduates from HBO and WO that left formal education. In the Netherlands there are also short-cycle programmes classified as ISCED 5B. However, according to UOE statistics only few students attend these courses.
NO	Higher education in Norway is organized as follow: (1) state university colleges; (2) private/ other university colleges; (3) specialized university institutions; (4) university. Colleges can also award ISCED 5B qualifications that last 2 years. Most of students attending a college, however, attain a Bachelor's degree (ISCED 5A). What differs is just the length. In general, colleges are more professionally oriented (not all subjects are covered though).

Table 2.11: Continued

Country	Notes
PL	Tertiary education in Poland is divided in university and non-university institutions (colleges), although the latter covers only few subjects/professions. The non-university programmes specialize students for the teaching profession and for being social workers. The former was introduced in the 90s, while the latter in 2005. They last 3 years. Data derived from Eurostat database.
PT	Portugal has a binary system: universities and polytechnics. The latter, starting from the beginning of the 2000, can award short-cycle diplomas (first graduates in the academic year 2005/2006). The binary system is not clear-cut, though. There are universities that offer also courses generally provided by polytechnics. The data we have used, however, control for this bias. Polytechnics are classified as UAS, while the short-cycle programmes as ISCED 5B. Data derived from the national statistical institute.
RO	The Romanian higher education system has a unified structure.
SE	Besides university, the Swedish higher education system has two to three years programmes (classified either as ISCED 4C or ISCED 5B depending on the length). Despite the recent increase, participation to these programmes is not high. We decided to consider both programmes as ISCED 5B. Both are oriented toward the labour market and have a "death end", which means that they are not designed for students that intend to continue to higher levels of education.
SI	Until 2005 (before the Bologna reform) higher education in Slovenia was organized as follow: (1) short cycle vocational programmes (2 years); (2) professional study programmes (3-4 years); (3) academic study programmes (4-6 years). Short-cycle higher education programmes ended in 2002, while the first graduates from professional higher programmes started in 1996.
SK	Slovakia offers university and non-university programmes. The latter, however, is not really popular and between 1998 and 2009 it almost disappeared. It lasts 3 years. We have classified it as UAS. Data derived from Eurostat database.
UK	In the period we examine, the UK higher education system can be described as being unified (or stratified).

Table 2.12: Multilevel linear probability models showing the effects of vocational specificity at the secondary and tertiary level on having the 1st job matched, controlling for other macro-level indicators.

	Mod. 1	Mod. 2	Mod. 3	Mod. 4
Constant	.338	.334	.336	.359
Voc. specificity at the secondary level (country mean)	.053***	.053***	.051***	.050***
Voc. specificity at the secondary level (yearly deviation)	.016	.016	.017	.016
Voc. specificity at the tertiary level (country mean)	.036**	.036**	.029*	.039**
Voc. specificity at the tertiary level (yearly deviation)	.036**	.036**	.031*	.035**
EPL-temporary (country mean)		.002	.001	.004
EPL-temporary (yearly deviation)		-.017**	-.016**	-.017**
Unemployment (country mean)			-.021	-.024
Unemployment (yearly deviation)			-.007	-.011**
Tertiary share (country mean)				-.026*
Tertiary share (yearly deviation)				-.024**
Unexplained variance (country level)	.0031***	.0031***	.0028***	.0024***
Unexplained variance (country-year level)	.00073***	.00063***	.00061***	.00058***

Source: EU-LFS 2009. *** p<0.001, ** p<0.01, * p<0.05. Macro variables are standardized. *N*:81067; *N* country-year:330; *N* countries: 22. Models net of parental background, type of formal education, gender and age.

Table 2.13: Proportion of respondents across types of job-match

	Horizontal mismatch	Horizontal match
Vertical mismatch	16 %	10%
Vertical match	24%	50%

Table 2.14: Multilevel linear probability models showing the effects of vocational specificity at the secondary and tertiary level on having the first job vertically matched, horizontally matched and both vertically and horizontally matched. Both the within and between country effects are shown.

	Vertical Match	Horizontal Match	Vertical & Horizontal Match
Voc. specificity at the secondary level (country mean)	.026**	.047***	.050***
Voc. specificity at the secondary level (yearly deviation)	.016	.005	.016
Voc. specificity at the tertiary level (country mean)	.030**	.033*	.039**
Voc. specificity at the tertiary level (yearly deviation)	.018	.026*	.036**

Source: EU-LFS 2009. *** p<0.001, ** p<0.01, * p<0.05, $^{+}$p<0.10
Notes: Macro variables are standardized. *N*: 81067; *N* country-year:330; *N* countries: 22. Models are net of: parental education, gender, age, level and type of education, unemployment rate.

Table 2.15: Linear probability models showing the effects of vocational specificity at the secondary and tertiary level on having the first job matched among different social origin groups.

	Vertical Match	Horizontal Match	Vertical & Horizontal Match
Constant	.622	.584	.340
Parents' education (ref: ISCED 2 or below)			
- ISCED 3-4	.036***	.001	.020*
- ISCED 5-6	.096***	.012	.064***
Voc. specificity at the secondary level	.022**	.027**	.032**
Voc. specificity at the tertiary level	.019*	.028**	.033**
Voc. specificity at the secondary level * Parents' education (ref: ISCED 2 or below)			
- ISCED 3-4	-.002	-.004	-.008
- ISCED 5-6	-.005	-.013	-.011
Voc. specificity at the tertiary level * Parents' education (ref: ISCED 2 or below)			
- ISCED 3-4	.008	-.005	.003
- ISCED 5-6	-.016	-.026***	-.031***
Random slopes (country level)			
Parents' education (ref. ISCED 2 or below)			
- ISCED 3-4	.0005*	.0002	.0011*
- ISCED 5-6	.0021*	.0008	.0025*

Source: EU-LFS 2009. *** p<0.001, ** p<0.01, * p<0.05. $^{+}$p<0.10
Notes: Macro variables are standardized. *N*: 81067; *N* country-year:330; *N* countries: 22. Models are net of: gender, age, level and orientation of education, unemployment rate. The covariance between parental background groups is not shown.

Table 2.16: Fixed effects estimates (EDV) showing the association between country level features and job-matching patters (N 330). Two-step multilevel modelling approach. Effects decomposed in the between- and within-country components.

	M1	M2	M3	M4
Voc. specificity at the secondary level (country mean)	.070***	.070***	.067***	.066***
Voc. specificity at the secondary level (yearly deviation)	.018	.020	.022	.017
Voc. specificity at the tertiary level (country mean)	.040***	.040***	.031***	.039***
Voc. specificity at the tertiary level (yearly deviation)	.070***	.070***	.061***	.062**
EPL-temporary (country mean)		-.000	-.002	.000
EPL-temporary (yearly deviation)		-.017	-.017	-.017*
Unemployment (country mean)			-.027***	-.030***
Unemployment (yearly deviation)			-.009	-.008
Tertiary share (country mean)				-.020***
Tertiary share (yearly deviation)				-.005
R^2-adjusted	.51	.51	.55	.57

Source: EU-LFS 2009. *** p<0.001, ** p<0.01, * p<0.05. *Notes*: predicted probabilities were estimated for each country-year separately controlling for parental background, type of formal education, gender and age.

Table 2.17: Fixed effects estimates (EDV) showing the association between country level features and job-matching patters by parental background. Two-step multilevel modelling approach

	ISCED 1/2		ISCED 3/4		ISCED 5/6	
	M1	M2	M1	M1	M2	M1
Voc. specificity at the secondary level	.073***	.070***	.070***	.065***	.046***	.041***
Voc. specificity at the tertiary level	.038***	.035***	.052***	.054***	.012	.017*
EPL-temporary		-.009		.004		-.005
Unemployment		-.019*		-.028***		-.021**
Tertiary share		-.009		-.026***		-.028***
R^2-adjusted	.24	.25	.42	.48	.11	.16
N	327		330		330	

Source: EU-LFS 2009. *** p<0.001, ** p<0.01, * p<0.05. *Notes*: predicted probabilities were estimated for each country-year separately controlling for parental background, type of formal education, gender and age.

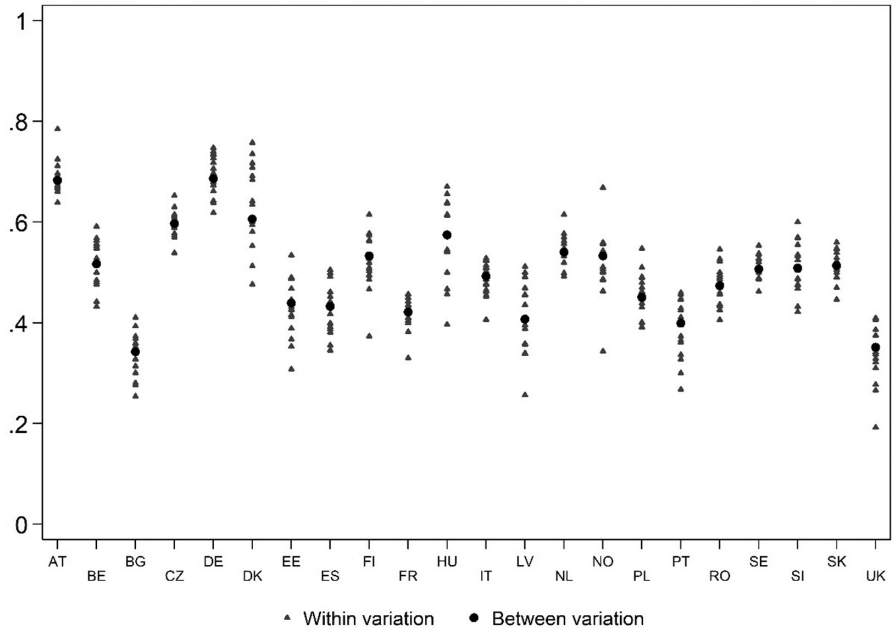


Figure 2.6: Between-country and within-country variation is job matching patterns

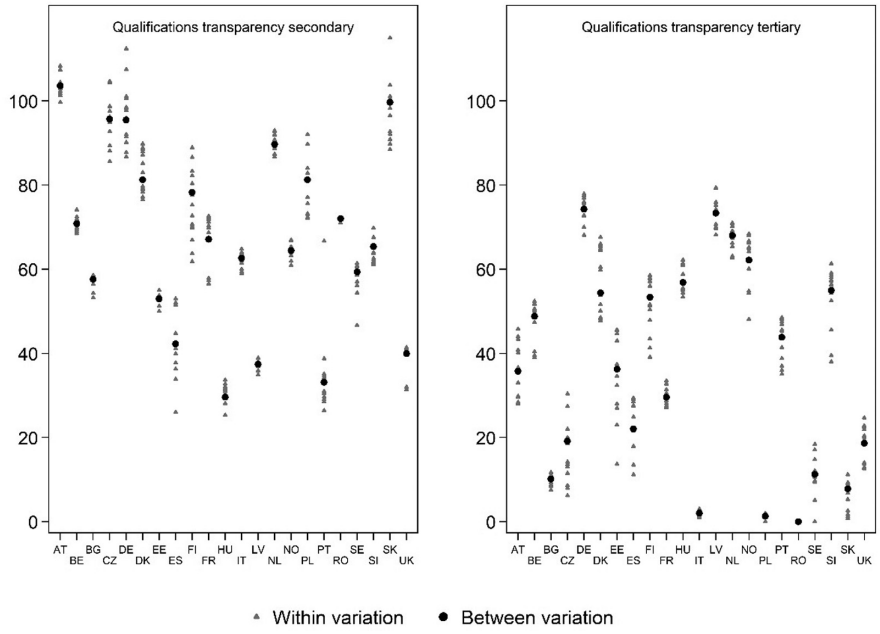


Figure 2.7: Between-country and within-country variation in vocational specificity at the secondary and tertiary level

3

Educational upgrading, career advancement, and social inequality development from a life-course perspective in Germany [2]

2 This is a co-authored chapter with Steffen Schindler, University of Bamberg. This chapter is currently R&R at Research on Social Stratification and Mobility.

Abstract: This chapter employs data from the adult cohort of the German National Educational Panel Study (NEPS) to investigate the extent to which upgrading of educational credentials over the life course influences the social stratification of labour market outcomes. We argue that credentials upgrading should be an important predictor of both inter- and intragenerational mobility, especially in Germany where occupational and educational attainment are tightly linked. Indeed, we show that career progression in Germany is dependent upon re-enrolment into formal education and that the gains in occupational status are hierarchically distributed across types and levels of educational upgrades. While much more persons of disadvantaged social background are at risk of upgrading, persons of advantaged backgrounds are both slightly more likely to upgrade and to upgrade to qualifications leading to the highest expected premiums. Despite these differences, educational upgrading does not alter the overall level of social stratification in occupational status attainment.

Introduction

The literature on school-to-work transitions has often treated the end of schooling and the entry into employment as if individuals would leave education and enter the labour market in a single step (i.e. Shavit and Müller 1998, Wolbers 2007, Kogan et al. 2011). However, the development of life-course research and the increasing availability of longitudinal datasets have underlined the importance of treating school-to-work transitions as a sequence of events characterised by multiple numbers of status activities and status shifts (Brzinsky-Fay and Solga 2016). In other words, the increasing complexity of young adults' pathways into the labour market challenges the attempt to define job entry as a single and coherent event. Rather, it should be seen as a period in which individuals switch between episodes of schooling and employment before "career maturity" is reached (i.e. Hillmert and Jacob 2003, Hillmert and Jacob 2010, Jacob and Weiss 2010), or combine work and education, postponing the attainment of a qualification (Roksa and Velez 2010, Weiss and Roksa 2016).

Still little is known about the dynamics that this creates in the formation process of social inequality. While the literature has extensively documented the importance of education in explaining the association between social origin and individuals' position in the labour market (Breen and Luijkx 2004), we know less about the extent to which dynamic processes of educational upgrading influence the level of social stratification (Blossfeld et al. 2014). For that reason, this chaper explores how credentials upgrading after labour market entry affects the association between social origin and labour market returns. We concentrate on Germany, which is a country with a tight linkage between educational credentials and labour market outcomes.

With this, we add to the literature by combining two strands of research. On the one hand, intergenerational social mobility research has typically been concerned with the mediating role of final educational outcomes in the association between social origin and destination (Breen et al. 2009). On the other hand, life-course oriented research on socially selective re-enrolment into formal education has typically focused on specific transition patterns, for instance from post-secondary to higher education (Jacob and Weiss 2010, Weiss 2013). By bringing together the two perspectives, we argue that inter- and intragenerational mobility should be assessed jointly in order to gain a deeper understanding of the dynamic aspects in the formation of social inequality. This helps to identify if and how social selectivities in educational upgrading have diminishing or reinforcing effects on the overall level of social stratification of labour market outcomes.

As we will argue below, the extent to which educational upgrading processes are able to impact the overall level of social stratification is a function of three factors: First, the labour market premiums that are attached to educational upgrading from and to different educational levels, second, the distribution of initial educational attainment within social origin groups (e.g. the distributions of persons at risk of upgrading), and third, the social selectivities in upgrading rates (conditional on being at risk). This article contributes to the literature by providing evidence on all three aspects. We will assess to what extent the cumulative effect of these factors still alters the level of social stratification after labour market entry.

The German context

The extent to which education and labour market returns are linked depends on the institutional contexts that exist in different countries (e.g. Müller and Gangl 2003). Germany is a prime example of an occupational labour market, where education and training exhibit a high level of vocational specificity. This has several implications that are important with regard to the role of educational upgrading. First, professional skills are largely transmitted in the education and training system, which means that labour market outcomes are highly stratified by formal educational credentials. Second, for that reason, Germany displays a comparatively low level of occupational mobility after initial labour market placement (cf. Mayer et al. 2010). Third, for those cases when occupational changes from a lower-level to a higher-level job occur, it can be expected that they are most likely based on the previous obtainment of a respective higher-level formal credential.

The German educational system can be described as a combination of general schooling and vocational or higher education. A characteristic feature of Germany's school system is its early between school-tracking in lower secondary education, which channels students into an academic trajectory preparing students for higher education, an intermediate track leading into vocational programmes aimed for salaried employment in clerical occupations, or a lower-level track leading into vocational programmes preparing students for (semi-)skilled manual occupations. Certificates obtained in vocational or higher education are an important requirement to access qualified occupations, while entering the labour market without vocational credentials is connected to clear disadvantages (Müller et al. 1998). The largest majority of German school leavers enter the labour market with secondary vocational training. The predominance of school

leavers with vocational training has kept returns to higher education high, whereby the wage distance between school leavers with vocational training and graduates of higher education is larger than the distance between school leavers with and without vocational training (Lauer and Steiner 2000, Hillmert and Jacob 2003).

Due to its tracked secondary school system, Germany has often been conceived of as an educational system where later-life occupational outcomes are to a large extent predetermined by school track allocation in lower secondary education. Since track allocation follows highly socially selective patterns, the tracked school system has been suspected of being a major source of the strong association between social origin and destination. However, this view neglects that the German education and training system offers ample opportunities for educational upgrading after the obtainment of a first educational or vocational certificate (Jacob and Tieben 2010, Weiss 2013). Two patterns can be distinguished. The first pattern comprises of sequential upgrades in the education and training system before people enter the labour market. The second pattern describes persons who are in the labour market already and re-enter the educational system to acquire a higher-level educational or vocational credential. In this context, it is also important to acknowledge that the vocational credentials that can be obtained in the German vocational training system comprise of a large variety of hierarchically ordered degrees, most of which can be obtained at institutions of further education. Hence, it is common for persons who already hold a credential to obtain an additional school or vocational degree, or upgrade their existing vocational degree to a higher-level post-secondary vocational credential or to a higher education degree.

Following this, we argue that the aforementioned expectation on occupational stability over the life course may change once we take into account individuals' decisions to re-enrol into formal education later in life. Due to the close linkage between formal credentials and access to occupations in Germany, educational upgrading should be an important way to improve labour market outcomes substantially. In addition, while the early-tracking German educational system is known to display a high degree of social selectivity in educational participation, educational upgrading processes might have either an attenuating or reinforcing effect on social inequality in educational attainment. Given the tight linkage between educational credentials and labour market outcomes, these upgrading processes might in turn change the level of social stratification of labour market outcomes.

Theoretical expectations

The development of labour market social stratification over the life course.
We start our theoretical considerations with some general expectations about the life-course development of the social stratification of labour market outcomes in a hypothetical situation without any educational upgrading. Given the social stratification of educational attainment and the strong coupling of credentials and occupations, occupational destinations at labour market entry are highly stratified with respect to social origin. Since career progression and the life-course development of labour market returns can be assumed to be steeper for higher-level occupations than for lower-level occupations (Bönke et al. 2011) it can be expected that the gap in labour market returns between people of privileged and disadvantaged social origin widens even more across the occupational career. Hence, persons of privileged origin would enjoy a *cumulative advantage* in the development of their labour market outcomes (DiPrete and Eirich 2006). This certainly holds true for all labour market outcomes that are subject to any sort of progression over time, such as earnings or even firm-internal career ladders (Doeringer and Piore 1971). However, since – in the absence of formal educational upgrading – job changes after first labour market placement are not very common in the German labour market (Kurz et al. 2006, Mayer et al. 2010), one would not expect to observe pronounced processes of cumulative advantage with regard to any occupation-based outcomes, such as occupational status or social classes. Hence, in contrast to changes in the stratification of earnings, which we would expect to be the result of a combination of cumulative advantage and educational upgrading, one would expect life-course changes in the social stratification of occupational outcomes to be almost exclusively due to upgrading of formal educational credentials.

Influence of upgrading
There are three key factors through which educational upgrading influences the overall level of social stratification in labour market outcomes.

The first factor relates to the different sizes of the populations from different social groups that are at risk of upgrading. The extent to which educational upgrades are able to alter the distribution of labour market outcomes of a given social group is determined by the number of people belonging to that group that are at risk of educational upgrading. This means that the higher the number of persons of a given social group that has only attained low levels of education, the higher the number of persons that are still able (at risk) to upgrade. Note that the size of that sub-group in the risk set is both a function of

the absolute size of the complete social group and the share of group members with low levels of education. Since initial educational attainment is known to be socially stratified in all Western societies (Breen et al. 2009), it can be expected that this factor operates in favour of the socially disadvantaged groups (as long as their overall group sizes are not significantly smaller than those of the socially advantaged groups).

The second factor relates to social differences in the conditional likelihood to upgrade. Changes in the overall level of social stratification of occupational outcomes are also influenced by social differences in the propensity to upgrade educational credentials among those at risk. The *compensatory advantage* mechanism suggests that individuals coming from privileged backgrounds are less affected by prior negative outcomes compared to underprivileged peers (Bernardi 2014). This expectation is based on the assertion of two core arguments. On the one hand, persons from privileged backgrounds possess more resources to accomplish an upward correction of their educational attainment. On the other hand, they also have higher incentives to reach higher-levels of occupational outcomes, which can be derived from the arguments related to the motive to avoid social demotion underlying relative-risk aversion theory (Breen and Goldthorpe 1997). Following this argument, the conditional propensity to upgrade should be higher among persons of privileged compared to underprivileged backgrounds.

However, the propensity to upgrade could also be influenced by selection mechanisms, such as crowding-out processes or insurance strategies. Crowding-out processes can follow from educational expansion when labour market positions that have been accessed by persons with lower levels of education are increasingly occupied by persons with higher levels of education. Such a devaluation of credentials can raise the perceived benefits of educational upgrading. In the German context, the overall prevalence of crowding-out processes seems to be rather low, while in particular, persons with lower levels of education appear to be exposed to decreasing labour market returns relative to persons with higher-level degrees (Klein 2011). Generally, one would expect crowding-out processes to primarily influence the investment into initial levels of education. If, however, knowledge about the devaluation of educational credentials is socially stratified through information asymmetries, it might indeed cause more persons of disadvantaged origin than persons of privileged origin to correct their educational credentials via upgrading. Insurance strategies, instead, apply when persons aim at higher educational credentials but are too risk-averse to enter programmes leading to these credentials directly. Then, the strategy is to obtain less risky lower-level credentials first, which act as a fallback option, before higher-level degrees are pursued. In this case, educational upgrading is part of a longer-term strategy (Büchel and Helberger 1995,

Hillmert and Jacob 2003). Insurance strategies should be more common among students of disadvantaged social origin (Hillmert and Jacob 2003), since they tend to be influenced more by risk-aversion (Breen et al. 2014). This mechanism would cause the distribution of disadvantaged persons at risk of upgrading to comprise more of persons who have ambitions for higher-level occupational outcomes. This example makes clear that social selectivities in educational upgrading are also a function of selection processes into initial levels of education.

While the compensatory advantage mechanism works towards enhancing the upgrading rates more among persons from privileged than from underprivileged groups, crowding-out processes and insurance strategies rather enhance the upgrading behaviour among persons from disadvantaged social groups. So far, however, all existing empirical evidence points towards a pattern which sees the former mechanism dominating the latter two mechanisms (Hillmert and Jacob 2010, Schindler 2015). Hence, it can be expected, that the second factor (conditional propensities to upgrade educational credentials) operates in favour of privileged social groups.

The third factor concerns social differences in the quality of educational upgrading. This relates to both the distances between the initial and the new educational level that people bridge through upgrading and the labour market premiums that are attached to the respective types of upgrading. It might be obvious that the larger the difference between the initial and the new educational level, the larger the premium of the upgrade. As a consequence of the social stratification of initial educational attainment, persons from underprivileged groups might thus have the biggest potential to gain the largest premiums. On the other hand, due to investment and opportunity costs, it can be expected that upgrades that cover short distances between educational degrees are more common than upgrades that bridge large distances. This would mean that upgrades of persons from disadvantages backgrounds should cluster more at lower to medium qualification levels and upgrades of persons from privileged backgrounds more at medium to higher qualification levels. It can also be expected that the quality of upgrading increases as we move upward on the educational hierarchy with high-level educational credentials leading to the highest labour market premium. This should be especially true in Germany where the predominance of school leavers with vocational training has kept returns to higher education high. Hence, it can be expected that the third factor (quality of upgrading) works in favour of the privileged social groups.

Whether, over the life course, the cumulative effect of these three factors leads to an increase or decrease of the level of social stratification of labour market outcomes depends on the weight that each of the three factors possessed. As this cannot be

derived analytically, it remains to be clarified empirically, which we will accomplish in the remainder of this chapter.

Data and methods

Data and variables

The chapter draws on data from Starting Cohort 6 of the National Educational Panel Study (NEPS, version 6.0.1), which provides rich retrospective life-course information from a random sample of adults in Germany. Individual career trajectories were reconstructed starting from the first significant job (which is operationalized as the first employment episode longer than twelve months and 20 hours weekly working time) until the last employment episode. Careers refer to the whole period in the labour market, thus including gaps (non-employment episodes such as unemployment, parental leave, and other gap episodes), and are reconstructed on a monthly basis. After listwise deletion, our working data set contains information on 10,779 individuals and 2,360,341 monthly spells.

Our key dependent variable is the International Socio-economic Index of Occupational Status (ISEI, Ganzeboom et al. 1992), which was derived from the 1988 version of the International Standard Classification of Occupations (ISCO-88). The scale ranges from 16 for occupations with the lowest to 90 for those with the highest socioeconomic status. Information on ISEI are recoded on a monthly basis for each employment episode. Using ISEI as an indicator of labour market outcomes means that any intra-individual change in its value implies a change of the occupation. One advantage of ISEI is that it can be considered as a continuous measure of occupational status, so that any increase should indicate an improvement in occupational status. On the other hand, one should note that by relying on ISEI we do not capture any within-job variation of labour market outcomes, such as earnings progression.

Our key independent variable is social class of origin, measured through a three-fold collapse of the EGP schema. It differentiates among the salariat (EGP I and II), the intermediate (EGP IIIa, IV, and V) and the working (EGP IIIb, VI, and VII) classes.

Our key mediating variable is educational attainment, which we measure as a combination of school leaving certificates and vocational degrees. The school leaving certificates comprise of the three levels of the German school system: Basic (*Hauptschule*), Intermediate (*Mittlere Reife*) and Abitur (*Hochschulreife*). The vocational categories comprise of: no vocational degree, vocational training (VOC1), higher-level post-

secondary vocational training (VOC2), and higher education (HE). By combining school leaving certificates and vocational degrees, we end up with ten different categories in our variable of educational attainment (note that higher education can only be combined with Abitur). Educational attainment is recoded on a monthly basis.

We consider as educational upgrading any upward change in the level of education irrespective of whether the person exited the labour market in order to obtain the credential or obtained it in further education programs that took place alongside the job.

In our analyses, we also control for a number of important variables in order to avoid confounding influences. However, the way in which we control for these variables differs by the type of analysis. To avoid confounding cohort effects, we conduct all our descriptive analyses separately by birth cohort. We distinguish three birth cohorts: 1944-1954, 1955-1964, 1965-1975. When estimating returns to upgrading (section 3.5.1) we control for age, age squared, gender, birth cohort, career, career squared, parental education (three categories: low, medium, high), social class of origin, and area of birth (East Germany, West Germany, abroad). When estimating the development of the gap in average ISEI between social classes (section 3.5.3), we control for wave, area of birth, and we interact career with both cohort and gender.

Analytical strategies

In order to estimate the average gains in ISEI associated with educational upgrading, our modelling strategy follows a *difference-in-differences* logic combined with a matching procedure. Our aim is to estimate the returns to upgrading by comparing the development of average ISEI over a constant time interval between people who do and do not upgrade their educational credential, who otherwise share similar characteristics. Unfortunately, the data has its limitations regarding the measurement of observable characteristics that account for selection into upgrading. Hence, it is likely that our results are somewhat overestimating the returns to upgrading, which is why they cannot be interpreted as causal estimates.

We estimate the average ISEI gains for upgraders by running separate models for each initial level of education, which means that each model contains individuals who hold the same educational credential at the beginning of their employment career. In each model, persons who never upgraded their credential constitute the control group. In order to create common support for our estimates, we restrict the set of initial ISEI values in the control group to be identical to the set of initial ISEI values in the treatment group (upgraders). Persons in the control group might enter the data set multiple times but with different sequences in their employment careers: For each person in the treatment

group we consider the elapsed time since labour market entry up until they have obtained their upgraded credential. For persons from the control group who share identical initial ISEI values, we consider the ISEI value after the same amount of elapsed time. Since each single person from the control group can serve as matching partner for several persons from the treatment group with different observation periods, people from the control group enter the data several times. In order to match on the elapsed time, we use intervals of 6 months up to the 60th month. We also create an additional data entry in the control group with an interval that equals the average duration of interruption among those in the treated group that show an interruption longer than 5 years (which is a marginal group). In other words, we employ a one-to-many matching procedure: each person from the treatment group are matched with all persons in the control group that share identical initial ISEI and the same elapsed time. When estimating the average ISEI gains, we employ the following model (separately for each initial level of education):

$$I_t = \beta_0 + \beta_1 U_t + \beta_2 I_{t-1} + \beta_3 T_t + \beta_4 C \qquad (1)$$

where each observation has two data entries (at t and t-1) for both ISEI and education. *I* denotes ISEI, U_t is a set of dummy variables indicating the credential at time t, T_t is the elapsed time between t-1 and t, and *C* is a vector of the control variables described above.

We employ *random effects growth curve models* in order to estimate social inequality development over individuals' working life. We choose random instead of fixed effects specification – which would estimate coefficients for time-varying variables free of unobserved heterogeneity bias – since in this paper we are more interested in (descriptive) career trajectories across different social groups and the mediating role of education. Career progression is estimated within ten 30-month intervals. The piecewise technique has the advantage to analyse career progression without requiring a predefined functional form. Spline coefficients tell us how much of occupational status change monthly after labour market entry in the first 2.5 years, between 2.6 and the fifth year, and so on for each spline interval up until 25 years. Models include the ten splines, social class, cohort, gender, dummies for waves, area of birth and education, and a linear specification for age at labour market entry. They also include interaction terms between the splines and each of the latter variables. In order to have rather similar career lengths for all individuals, we right-censored individuals' careers at 300 months (25 years).

Analyses

In the following analyses, we proceed in three steps. First, we give an overview of the prevalence of educational upgrading and analyse to what extent upgrading is generally associated with changes in ISEI levels. Second, we describe the levels of social selectivity in the distribution of persons at risk of upgrading and the prevalence and quality of educational upgrading. Third, and finally, our main analysis is devoted to changes of social inequality in labour market outcomes across the life course. We analyse to what extent these changes are due to socially selective educational upgrading. In order to control for cohort effects in our most central descriptive analyses, we provide them separately by cohort.

Educational upgrading in Germany and average ISEI gains

Table 3.1 displays the distribution of initial education at labour market entry and educational upgrading rates within categories of initial education, comprising all birth cohorts (the general patterns do not differ substantially between cohorts, c.f. Table 3.3 in the Appendix). The second column shows the distribution of initial levels of education. It can clearly be seen that most persons enter the labour market with a vocational credential. The most important categories are Basic+VOC1, Intermediate+VOC1, and Higher Education.

The remaining columns display upgrading rates within each category of initial education. It can be seen that persons who decide to attain a higher-level qualification after a first period in the labour market are not a marginal group. In total, about 17 percent of the persons who entered the labour market engaged in educational upgrading. Three main patterns of upgrading can be observed. First, educational upgrading is more likely if the initial credential is only a general school certificate but not a vocational degree. This is in particularly true for persons who enter the labour market with an Abitur. Here we observe quite large upgrading rates to higher education. Note however, that our coding rules for a significant job (at least one year duration and 20 hours weekly working time) might classify persons who are bridging the waiting time for a study place in higher education with a low-skilled job as having entered the labour market. This has to be taken into account when considering the ISEI gains through upgrading in this particular group – which, however, is a rather marginal category. Second, upgrading is also very common from vocational training to higher-level post-secondary vocational training – irrespective of the school certificate. Third, upgrading to a higher education degree is common among persons holding an Abitur – irrespective of the level of their vocational degree.

Figure 3.1 displays the development of average ISEI over the life course among upgraders and non-upgraders by types of qualification at labour market entry for persons born between 1965 and 1975. The patterns are quite similar for the other cohorts, which can be found in the appendix (Figures 3.7 and 3.8). In line with our general expectation, occupational upward mobility in Germany occurs almost exclusively in the group of individuals that upgrade their educational degrees. In contrast, the career growth for non-upgraders is rather flat, indicating occupational stability over the life course. This result is in line with previous research describing the German employment system as being stratified along educational qualifications.

Table 3.2 presents results from the models estimating average ISEI gains through upgrading. Coefficients refer to the average predicted increase in ISEI that results from moving from a lower to a higher qualification, holding constant initial ISEI and education, labour market experience, cohort, gender, and the duration of labour market interruption. Initial qualifications held at labour market entry and their average ISEI levels are indicated in the last row of Table 3.2, while the qualification of destination is reported in the first column. Models are run separately for each initial qualification. Educational mobility can be clustered into three groups: first, individuals who upgrade by attaining a higher-level general qualification; second, individuals who upgrade by attaining either a vocational qualification or a higher-order vocational qualification (including a university degree); third, individuals who upgrade by attaining both general as well as vocational qualifications. Some of these results must be interpreted with caution, given the rather small sample size in some cells. Due to the close nexus between qualifications and occupations, we expected that labour market premiums in the German context are largely determined by the combination of the level of general education and the type and level of specialized training attained by students. It is the combination of general and specialized training that gives access to the large variety of occupations.

Our results support the view of the German labour market as being highly stratified along educational qualifications. As shown in the last row of Table 3.2, the average ISEI increases with levels and types of initial general and vocational training substantially. Furthermore, occupational mobility is to a large extent determined by the combination of general and vocational qualifications. In order to progress through the occupational ladder, both general and vocational skills need to be upgraded simultaneously. Upgrading only one or the other reduces substantially the opportunities of occupational advancement. This is in line with previous literature showing how vocational training opportunities in Germany can be grouped hierarchically into segments according to the level of general education and occupations (Baethge and Wolter 2015).

Table 3.1: Distribution of initial level of education and upgrading rates

Initial level	Distribution education at LM entry	Upgrading rates conditional on initial level of education									
		Basic	Basic+ VOC1	Interm.	Interm.+ VOC1	Abitur	Abitur+ VOC1	Basic+ VOC2	Interm.+ VOC2	Abitur+ VOC2	Higher Education
Higher Educ.	20										100
Abitur+VOC2	2									91	9
Interm+VOC2	4								94	1	5
Basic+VOC2	1							96	0	1	2
Abitur+VOC1	8						74	0	0	10	16
Abitur	5					44	12	0	0	6	38
Interm+VOC1	29				82	0	1	0	11	1	5
Intermediate	4			60	24	1	1	0	7	1	7
Basic+VOC1	21		84	0	2	0	1	11	1	0	2
Basic	5	70	18	1	3	1	1	2	0	0	3

Note: VOC2 implies having also VOC1

Upgrading from the lowest school-leaving certificate, which should lead to occupational opportunities in the unskilled job market, to a secondary vocational qualification leads to rather limited occupational advancement. This result could be explained by the substantial contraction of this segment of the labour market (Schneider and Tieben 2011). A small ISEI increase is also observed when individuals attain a secondary vocational qualification from an intermediate school-leaving certificate. However, persons with this level of general education have, on average, a comparatively high ISEI at labour market entry. In short, at the lowest extreme of the educational distribution attaining a secondary vocational qualification leads to similar occupational opportunities as upgrading to higher levels of general education, which is in contrast with the long-standing evidence describing vocational training in Germany as being the only entry ticket to all segments of the labour market (i.e. Shavit and Müller 1998). On the other hand, the highest premium is associated with attaining a university degree, which outdistances all other qualifications, as we hypothesized.

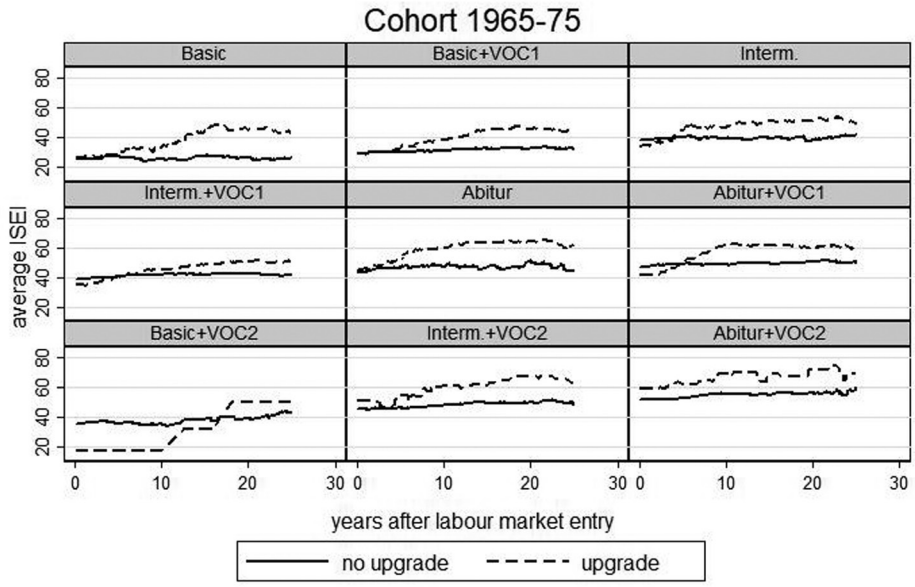


Figure 3.1: Development of average ISEI over the career cycle, by upgrading status

As a sensitivity check, we replicated this analysis using an ISEI outcome variable with a 12 months time lag. With this, we take into account that some persons upgrade their credentials while they are still in their initial job and might transfer to a higher-level job with some delay after obtaining the new educational degree. However, this does not influence the findings (c.f. Table 3.4 in the Appendix).

Distribution of educational qualification and educational mobility over the life course by social origin

To give an impression of the social stratification of educational attainment at labour market entry, Figure 3.2 displays the distributions of initial qualifications by cohort. Although slightly decreasing, the distributions show clear patterns of social stratification of educational attainment in all cohorts. This means that, as expected, the potential to upgrade to higher levels of education is more pronounced among disadvantaged social groups.

Figure 3.3 displays re-enrolment rates by the initial level of education at labour market entry and by social background for the three birth cohorts. We reasoned that social selectivities in educational upgrading rates can be influenced both by processes which operate in favour of privileged social groups (compensatory advantage) and processes that work in favour of underprivileged groups (such as risk averse educational decisions or information deficits about labour market outcomes). As a general pattern we might conclude that – with some exceptions – upgrading rates tend to be highest among persons from privileged social groups. This is in line with observations from previous research that processes of compensatory advantage seem to dominate over such genotypical processes that operate in favour of disadvantaged social groups. In our data, this pattern appears clearest for the youngest cohort and least pronounced in the oldest cohort.

Table 3.2: Average gains in ISEI associated with credentials upgrading.

Higher Education	30 (21)	27 (62)	16 (41)	20 (220)	16 (270)	13 (203)		13 (32)	14 (35)	
Abitur+VOC2		14 (13)	17 (6)	11 (30)	7 (46)	7 (123)		6 (9)		
Interm+VOC2	1 (3)	17 (31)	12 (45)	7 (505)						
Basic+VOC2	2 (15)	9 (341)								
Abitur+VOC1	9 (6)	14 (25)	1 (10)	4 (83)	4 (112)					
Abitur	13 (18)		8 (14)							
Interm+VOC1	12 (19)	7 (61)	4 (158)							
Intermediate	7 (12)									
Basic+VOC1	5 (137)									
Initial educ. level	Basic	Basic+ VOC1	Interm.	Interm.+VOC1	Abitur	Abitur+ VOC1	Basic+ VOC2	Interm.+VOC2	Abitur+ VOC2	Higher Education
Average ISEI (std. deviation)	25 (11)	32 (11)	39 (15)	40 (14)	44 (19)	47 (14)	36 (15)	47 (16)	54 (14)	68 (18)

Note: in parenthesis the number of upgraders. Models net of gender, cohort, EGP, parental education, initial ISEI, career and career squared.

Figure 3.2: Distribution of educational attainment at labour market entry, by birth cohort

However, the figures only relate to upgrading rates conditional on the initial level of education at labour market entry. For an assessment of influence that these types of upgrading have on changes in the overall level of social stratification of occupational outcomes, it is necessary to weight these conditional upgrading rates with the share of persons from a given social group that is in the respective category of initial education. For that reason, Figure 3.4 displays the share of the overall social origin groups that are in the respective upgrading categories (for example, two percent of all persons from the working class engage in educational upgrading from a basic school leaving certificate). A pattern that is common to all birth cohorts is that comparatively higher shares of the privileged social groups are upgrading from higher levels of education while comparatively higher shares of the disadvantaged groups are upgrading from lower levels of education. A similar pattern emerges if the social selectivities in the destinations are considered: persons from privileged social origin tend to upgrade comparatively more often to higher levels of education (c.f. Figure 3.9 in the Appendix). If we take into account that the average increase in ISEI tends to be higher the higher the educational level of the upgrade, these differences, although limited in size, could lead to a slight increase of inequality over the life course.

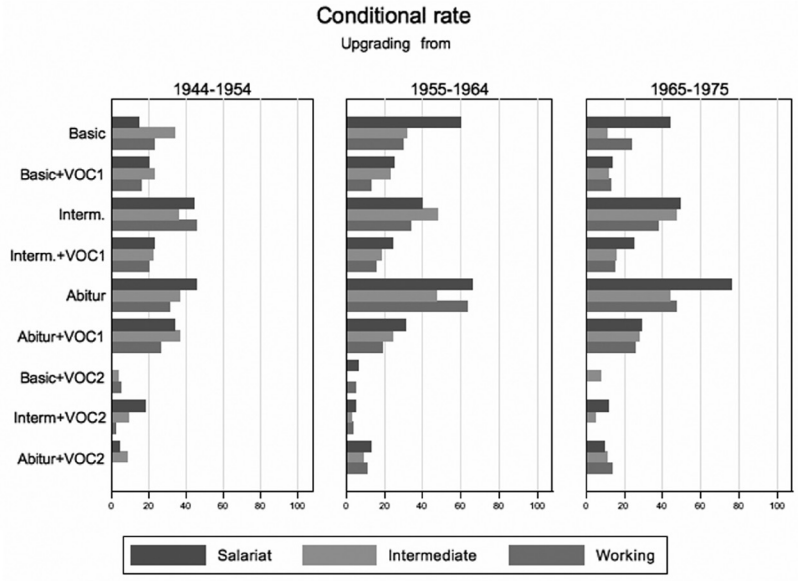


Figure 3.3: Educational upgrading rates by initial level of education and social origin

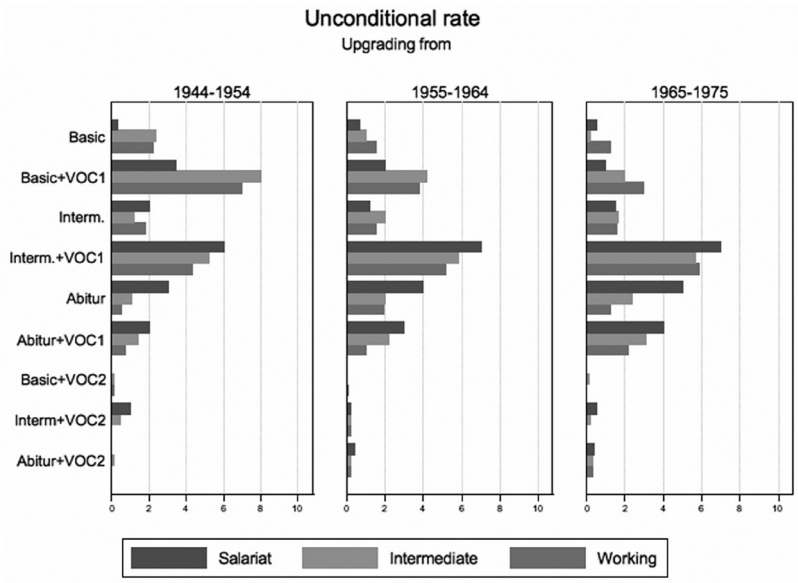


Figure 3.4: Distribution of educational upgrading over initial level of education, by social origin

Occupational stratification development and the impact of educational upgrading on differentials in career progression

To analyse the extent to which educational upgrading influences the level of social inequality in occupational placement across the life course, we now assess how the different mechanisms of socially selective upgrading operate cumulatively. We reasoned that the development of social stratification in occupational outcomes is determined by three factors. First, the share of a social group at risk of educational upgrading; second, the position in the educational distribution in which the share of a social group at risk of educational upgrading tends to concentrate; third, the conditional propensity of a social group to upgrade. Following the results shown in the previous sections, we found that the first factor works in favour of the disadvantaged social groups while the second and third factors work in favour of the privileged social groups.

Figure 3.5: Development of average ISEI over the career cycle, by social origin

Figure 3.5 gives a first descriptive overview of the development of average ISEI by social origin. While the average ISEI increases over the career for all social classes, the figure already shows that these increases develop rather parallel. Hence, the descriptive plot already indicates that the level of social stratification in socio-economic status does not change substantially over the life cycle. Note that in the youngest cohort the figures

after 12 years of job experience have to be discarded due to the underrepresentation of persons holding a higher education degree.

To analyse this development in a more formal way, we estimate growth curve models that predict social differentials in ISEI development over the career. In order to estimate the extent to which educational upgrading contributes to the development of social inequality, we employ a three-step approach. In Model 1, we estimate the gross effect of parental background on career progression (controlling for wave, the interaction between birth cohort and career, and between sex and career). In Model 2, we control for education at labour market entry. In Model 3, we control for the time-varying measure of education. This approach allows estimating the role re-enrolment plays in the formation process of social inequality over the life course. Figure 3.6 displays the results (we provide the regression table in the Appendix, Table 3.5).

In line with previous research, Model 1 shows a large differential between persons from the working and the salariat classes; however, over the life course initial disparities remain rather stable. Model 2 controls for educational attainment at labour market entry. Most of the gap at labour market entry is indeed explained by initial differences in educational attainment among social groups. This is in line with the long-standing evidence in social stratification literature that educational attainment is a strong mediator of the relationship between social origin and occupational destination (i.e. Breen and Luijkx 2004). Model 3 includes the time-varying measure of educational attainment. Since inequality is rather stable over the life course, there seems to be little to no value in educational upgrading for occupational inequality. We observe, however, a reduction of the differential in the first five years after labour market entry, when re-enrolment is more likely to occur. In short, educational upgrading does not alter the inequality structure in the German labour market, at least with regard to job change.

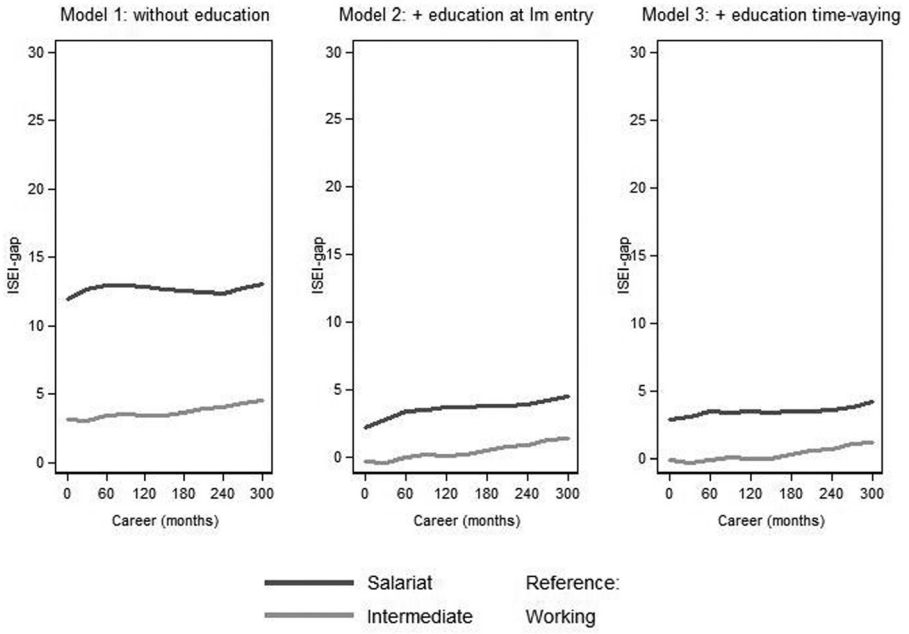


Figure 3.6: Random effects growth curve models of ISEI, coefficients of social origin

Note: Models include ten splines, interaction terms between splines and social class, cohorts, and gender, dummies for waves, area of birth and education, and a linear specification for age at labour market entry. Individuals' careers are right-censored at 300 months (25 years).

Conclusion and discussion

In this article, we have analysed the extent to which educational upgrading after labour market entry influences the level of social stratification in occupational status in Germany. We expected that educational upgrading in Germany should be the most relevant predictor of occupational advancement, due to the tight linkage between educational credentials and labour market outcomes. Our analyses seem to support this expectation. While we see virtually no improvement in the average occupational status among persons who do not upgrade their educational credential, we do see substantial increases of the average ISEI for upgraders.

The evidence which describes occupational opportunities in Germany as being hierarchically distributed across types of qualification is clearly substantiated by our findings as well. First, we have shown that career advancement in Germany is rather stable, unless individuals decide to upgrade their educational credentials by attaining higher levels of education. Second, we have shown that gains in ISEI associated with educational upgrading are largely dependent upon the combination between general and vocational training, with remarkably higher returns as individuals attain both higher levels of general education and higher order vocational qualifications. In line with previous studies (Lauer and Steiner 2000), we have also found that attaining a university degree, irrespective of the point of departure, leads to the highest return. Conversely, we provided evidence for a rather limited pay-off associated with educational upgrading at the lowest extreme of the educational distribution, which might be a sign of the contraction of this segment of the labour market.

In regards to the potential of educational upgrading to impact the level of social stratification in occupational outcomes, we have identified three relevant aspects that can be expected to follow socially selective patterns: the number of persons at risk of upgrading, the upgrading propensities of those at risk, and the quality of educational upgrading. Our results indicate that the first factor operates in favour of persons from disadvantaged social backgrounds, while the latter two factors work in favour of those from privileged social backgrounds. However, in total, these processes do not alter the level of social stratification in occupational outcomes over the occupational life course. Instead, our results seem to confirm the view that the social stratification of initial educational attainment is the key driving force of the social stratification of labour market outcomes. At first glance, this might be unsurprising, since the German labour market is known to follow the “occupational labour market” model (Marsden 1986), which is accompanied by a comparatively low level of job changes once persons have entered

the labour market. Our results still add to the existing literature. First, we have shown that educational upgrading is not actually a marginal phenomenon in the German labour market since 17 percent of labour market entrants engage in some sort of upgrading afterwards. Second, it has been shown that those who do upgrade their educational credentials actually tend to improve their occupational status. Third, we have clarified that – as far as occupational status is concerned – job mobility patterns do not describe any processes of cumulative advantage nor any catch-up processes of the disadvantaged groups over the career cycle. Hence, even though the overall level of job changes is low, we have documented that among those who engage in occupational upgrading there is no social group that particularly benefits from it. This leaves us with the conclusion that any attempts that are directed towards lowering the comparatively high level of social stratification of labour market outcomes are well advised to target the comparatively high level of social stratification at initial educational attainment before people enter the labour market. In absolute terms, however, upgrading of educational credentials remains a mean to move on towards the occupational ladder. Further, it could also help to decrease other risks, such as skills obsolescence and unemployment. Since we could expect the risk of both skills obsolescence and unemployment to be greater among persons with lower levels of education, upgrading of educational credentials could be a way to reduce these risks especially for the most disadvantaged

In light of these findings, some important remarks might however be in order. First, in our analyses, we have only considered educational upgrading processes that take place after labour market entry. As we have described earlier, it is quite common in the German educational system that individuals upgrade their first educational credentials before they enter the labour market for the first time. Hence, our findings will have to be complemented by analyses of the social selectivities that are associated with these types of upgrades and their consequences for the social stratification in labour market placement. Second, by considering occupational status as our key outcome variable, we have focussed on the specific aspect of job changes. As we have pointed out in the theoretical part, with this we do not cover any sort of labour market outcomes that vary within-jobs. The most obvious outcome would be earnings. It can be expected that concentrating on occupational status conceals effects of educational upgrading on earnings trajectories that actually can cause changes in social stratification over the career cycle. Hence, by looking at such outcomes, the results might be quite different from the conclusions that we draw with respect to occupation-based measures. Unfortunately, our data clearly reaches limits here and looking at wage inequality and the mediating role of educational upgrading remains a fundamental task for further research.

Acknowledgements

This chapter uses data from the National Educational Panel Study (NEPS): Starting Cohort Adults, doi:10.5157/NEPS:SC6:6.0.1. From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network.

We thank two anonymous reviewers for their valuable and constructive comments.

Appendix

Table 3.3: Distribution of initial level of education and upgrading rates

Initial level	Distribution education at LM entry		Upgrading rates conditional on initial level of education									
			Basic	Basic+ VOC1	Interm.	Interm.+ VOC1	Abitur	Abitur+ VOC1	Basic+ VOC2	Interm.+ VOC2	Abitur+ VOC2	Higher Education
Cohort 1944-1954												
Higher Educ.	18											100
Abitur+VOC2	1										95	5
Interm+VOC2	4									91	0	9
Basic+VOC2	2								94	1	0	2
Abitur+VOC1	4							69	0	0	10	22
Abitur	3						58	14	0	0	11	17
Interm+VOC1	27					79	0	1	0	13	1	7
Intermediate	4				59	21	3	0	0	6	0	11
Basic+VOC1				81	0	2	0	1	12	1	0	2
Basic	7	33	76	18	1	2	0	0	2	0	0	1

Note: VOC2 implies having also VOC1

Table 3.4: Average gains in ISEI associated with credentials upgrading – specification with a 12-months lagged ISEI

Higher Education	29	(21)	27	(62)	16	(41)	20	(220)	17	(270)	15	(203)		13	(32)	15	(35)			
Abitur+VOC2			13	(13)	17	(6)	12	(30)	7	(46)	6	(123)		4	(9)					
Interm+VOC2	-1	(3)	17	(31)	11	(45)	7	(505)												
Basic+VOC2	2	(15)	9	(341)																
Abitur+VOC1	9	(6)	14	(25)	1	(10)	5	(83)	4	(112)										
Abitur	12	(18)			8	(14)														
Interm+VOC1	17	(19)	7	(61)	4	(158)														
Intermediate	7	(12)																		
Basic+VOC1	5	137)																		

Initial educ. level	Basic	Basic+ VOC1	Interm.	Interm.+VOC1	Abitur	Abitur+ VOC1	Basic+ VOC2	Interm.+VOC2	Abitur+ VOC2	Higher Education
Average ISEI (std. deviation)	25 (11)	32 (11)	39 (15)	40 (14)	44 (19)	47 (14)	36 (15)	47 (16)	54 (14)	68 (18)
Average months in job before upgrade*	44	78	47	65	40	52	62	63	54	

Note: in parenthesis the number of upgraders. Models net of gender, cohort, EGP, parental education, initial ISEI, career and career squared.
*upgraders only

Table 3.5: Growth curve models

	Model 1	Model 2	Model 3[1]
Wave (ref: 2007/2008)			
2009/2010	2.085***	2.224***	1.870***
2010/2011	3.512***	3.605***	2.769***
2011/2012	1.937***	2.164***	1.665***
2012/2013	2.137***	2.369***	1.651***
2013/2014	2.593***	2.983***	2.183***
Area of residence (ref: West)			
East	-3.853***	-4.539***	-5.088***
Abroad	-5.436***	-6.732***	-5.284***
Age LM entry		0.588***	0.972***
Age LM entry 2		-0.0380***	-0.0407***
EGP (ref: working)			
Salariat	11.97***	2.143***	2.854***
Intermediate	3.186***	-0.310	-0.143
Career (spline)			
Spline 1	0.0435***	0.0572***	0.0329***
Spline 2	0.0402***	0.0819***	0.0606***
Spline 3	0.0340***	0.0333***	0.0144*
Spline 4	0.0353***	0.0527***	0.0358***
Spline 5	0.0209***	0.0257***	0.0186**
Spline 6	0.0009	0.0127*	0.0238***
Spline 7	0.0130***	0.0037	0.0026
Spline 8	-0.0004	0.0023	-0.0080
Spline 9	0.0004	-0.0051	-0.0125
Spline 10	-0.0070*	0.0044	0.0104
Social class*career (ref: working)			
Salariat *spline1	0.0213***	0.0211***	0.0056
Intermediate*spline1	-0.00407	-0.00329	-0.0058
Salariat*spline2	0.0118***	0.0208***	0.0148***
Intermediate*spline2	0.0120***	0.0137***	0.0076**
Salariat*spline3	0.0000590	0.00344	-0.00214
Intermediate*spline3	0.00499	0.00549	0.00431
Salariat*spline4	-0.00289	0.00544*	0.00280
Intermediate*spline4	-0.00457	-0.00262	-0.00296
Salariat*spline5	-0.00710**	-0.000416	-0.00434
Intermediate*spline5	0.000509	0.00285	0.00162
Salariat*spline6	-0.00245	0.00379	0.00419
Intermediate*spline6	0.00728*	0.00939**	0.00956**

Table 3.5: Continued

	Model 1	Model 2	Model 3[1]
Salariat*spline7	-0.00484	-0.00100	-0.00163
Intermediate*spline7	0.00945**	0.0106**	0.00973**
Salariat*spline8	-0.00220	0.00502	0.00346
Intermediate*spline8	0.00196	0.00464	0.00455
Salariat*spline9	0.0106***	0.00871**	0.00912**
Intermediate*spline9	0.0118***	0.0108**	0.0104**
Salariat*spline10	0.0114**	0.00974*	0.0121**
Intermediate*spline10	0.00617	0.00530	0.00393
Cohort (ref: 1944-54)			
1955-64	1.002*	-1.898***	-2.254***
1965-75	0.0444	-3.347***	-4.016***
Cohort*career(ref:1944-54)			
1955-64 *spline1	0.000594	0.000234	0.00312
1965-75 *spline1	-0.00812*	-0.00814*	0.000722
1955-64 *spline2	-0.00731**	-0.00988***	-0.0110***
1965-75 *spline2	-0.00174	-0.00526	-0.00523
1955-64 *spline3	-0.0115***	-0.0123***	-0.0106***
1965-75 *spline3	0.000172	-0.00166	-0.000169
1955-64 *spline4	-0.00941***	-0.00882***	-0.00586*
1965-75 *spline4	-0.00953***	-0.00968***	-0.00552*
1955-64 *spline5	-0.000891	0.000140	-0.000396
1965-75 *spline5	0.00939**	0.00977**	0.00842**
1955-64 *spline6	0.00410	0.00642*	0.00702**
1965-75 *spline6	-	-	-
1955-64 *spline7	-0.00643*	-0.00732**	-0.00747**
1965-75 *spline7	-	-	-
1955-64 *spline8	0.00733**	0.00901***	0.00901***
1965-75 *spline8	-	-	-
1955-64 *spline9	0.00104	-0.00104	-0.00102
1965-75 *spline9	-	-	-
1955-64 *spline10	0.00975**	0.00710*	0.00746*
1965-75 *spline10	-	-	-
Gender (ref: male)			
Female	3.625***	5.039***	5.245***
Gender*career(ref: male)			
Female*spline1	-0.0166***	-0.0201***	-0.00826**
Female*spline2	-0.0200***	-0.0273***	-0.0127***
Female*spline3	-0.0211***	-0.0230***	-0.0173***

Table 3.5: Continued

	Model 1	Model 2	Model 3[1]
Female*spline4	-0.0170***	-0.0181***	-0.0142***
Female*spline5	-0.0188***	-0.0188***	-0.0144***
Female*spline6	-0.00148	-0.000508	0.0000454
Female*spline7	-0.0103***	-0.0122***	-0.00941***
Female*spline8	-0.00234	-0.0000714	0.000874
Female*spline9	-0.00610*	-0.00623*	-0.00595*
Female*spline10	-0.00450	-0.00512	-0.00305
Education (ref: basic)			
Basic+VOC1		5.040***	4.512***
Intermediate		13.55***	8.203***
Inter.+VOC1		12.95***	13.75***
Abitur		18.31***	10.49***
Abitur+VOC1		17.23***	14.34***
Basic+VOC2		10.17***	12.26***
Interm.+VOC2		20.43***	20.35***
Abitur+VOC2		23.95***	24.02***
HE		39.68***	34.48***
Education*career (ref: basic)			
Basic+VOC1*spline1		-0.0195**	-0.0138
Intermediate*spline1		0.00546	-0.0174
Inter.+VOC1*spline1		-0.00797	-0.00922
Abitur*spline1		0.0748***	-0.0183
Abitur+VOC1*spline1		-0.0000423	-0.00474
Basic+VOC2*spline1		-0.0595***	-0.0288*
Interm.+VOC2*spline1		-0.0209*	-0.00844
Abitur+VOC2*spline1		-0.0478***	-0.0320**
HE*spline1		-0.0464***	-0.0243***
Basic+VOC1*spline2		-0.0424***	-0.0335***
Intermediate*spline2		-0.0202*	-0.0465***
Inter.+VOC1*spline2		-0.0292***	-0.0295***
Abitur*spline2		0.0721***	-0.0255**
Abitur+VOC1*spline2		-0.00551	-0.0275***
Basic+VOC2*spline2		-0.0740***	-0.0651***
Interm.+VOC2*spline2		-0.0484***	-0.0279***
Abitur+VOC2*spline2		-0.0306***	-0.0356***
HE*spline2		-0.0872***	-0.0687***
Basic+VOC1*spline3		0.00480	0.00654
Intermediate*spline3		-0.00577	-0.00723

Table 3.5: Continued

	Model 1	Model 2	Model 3[1]
Inter.+VOC1*spline3		0.000479	0.00832
Abitur*spline3		0.0855***	0.0521***
Abitur+VOC1*spline3		0.0308***	0.0189*
Basic+VOC2*spline3		0.0358***	0.0571***
Interm.+VOC2*spline3		-0.00222	0.0118
Abitur+VOC2*spline3		-0.0148	0.0156
HE*spline3		-0.0260***	0.003
Basic+VOC1*spline4		-0.0149*	-0.00561
Intermediate*spline4		-0.0210**	-0.0356***
Inter.+VOC1*spline4		-0.0174**	-0.00920
Abitur*spline4		-0.0419***	-0.0457***
Abitur+VOC1*spline4		0.00533	-0.00928
Basic+VOC2*spline4		0.0208*	-0.00224
Interm.+VOC2*spline4		-0.00931	-0.00760
Abitur+VOC2*spline4		-0.0369***	-0.0131
HE*spline4		-0.0442***	-0.0265***
Basic+VOC1*spline5		0.00612	0.000758
Intermediate*spline5		0.00300	-0.00915
Inter.+VOC1*spline5		-0.00968	-0.00543
Abitur*spline5		-0.00366	-0.0297**
Abitur+VOC1*spline5		-0.00440	0.0199*
Basic+VOC2*spline5		-0.0224*	0.00236
Interm.+VOC2*spline5		-0.00850	-0.0129
Abitur+VOC2*spline5		-0.00126	-0.00503
HE*spline5		-0.0276***	-0.0123
Basic+VOC1*spline6		-0.00432	-0.0226**
Intermediate*spline1\6		0.0121	-0.0282**
Inter.+VOC1*spline6		-0.0220***	-0.0366***
Abitur*spline6		-0.0265**	-0.0260*
Abitur+VOC1*spline6		-0.00715	-0.0158
Basic+VOC2*spline6		0.00771	-0.000818
Interm.+VOC2*spline6		-0.0398***	-0.0394***
Abitur+VOC2*spline6		-0.0303**	-0.0315**
HE*spline6		-0.0267***	-0.0395***
Basic+VOC1*spline7		0.0128	0.00406
Intermediate*spline7		0.0323***	0.00970
Inter.+VOC1*spline7		0.0108	0.0129
Abitur*spline7		0.0177*	-0.00338

Table 3.5: Continued

	Model 1	Model 2	Model 3[1]
Abitur+VOC1*spline7		0.0418***	0.0333***
Basic+VOC2*spline7		0.0193	0.0251**
Interm.+VOC2*spline7		0.00836	0.00876
Abitur+VOC2*spline7		0.00481	0.0241*
HE*spline7		-0.0124	-0.00382
Basic+VOC1*spline8		0.00889	0.0120
Intermediate*spline8		-0.0191*	-0.00854
Inter.+VOC1*spline8		-0.00997	-0.00127
Abitur*spline8		-0.0199*	0.00162
Abitur+VOC1*spline8		-0.0110	-0.000740
Basic+VOC2*spline8		-0.0166	0.0317***
Interm.+VOC2*spline8		-0.0168*	-0.00486
Abitur+VOC2*spline8		-0.0118	-0.0193
HE*spline8		-0.0176*	-0.00335
Basic+VOC1*spline9		0.00169	0.00729
Intermediate*spline9		0.0177	0.0331**
Inter.+VOC1*spline9		0.0141*	0.0199*
Abitur*spline9		-0.00616	-0.00137
Abitur+VOC1*spline9		0.00157	0.0106
Basic+VOC2*spline9		0.0267*	0.0233*
Interm.+VOC2*spline9		-0.0131	0.00889
Abitur+VOC2*spline9		0.0299**	0.0257*
HE*spline9		0.00468	0.0109
Basic+VOC1*spline10		-0.0135	-0.0211*
Intermediate*spline10		-0.0165	-0.0275
Inter.+VOC1*spline10		-0.00961	-0.0207*
Abitur*spline10		0.00198	-0.00597
Abitur+VOC1*spline10		-0.0141	-0.0166
Basic+VOC2*spline10		-0.0207	-0.0120
Interm.+VOC2*spline10		-0.00848	-0.00326
Abitur+VOC2*spline10		-0.00129	-0.0141
HE*spline10		-0.0125	-0.0238*
Constant	37.81***	26.50***	28.38***
N Individuals	10,779	10,779	10,779
N Monthly spells	2,360,341	2,360,341	2,360,341

1) While in Model 2 education refers to the level of education at labour market entry, in Model 3 it refers to the time-varying measure.

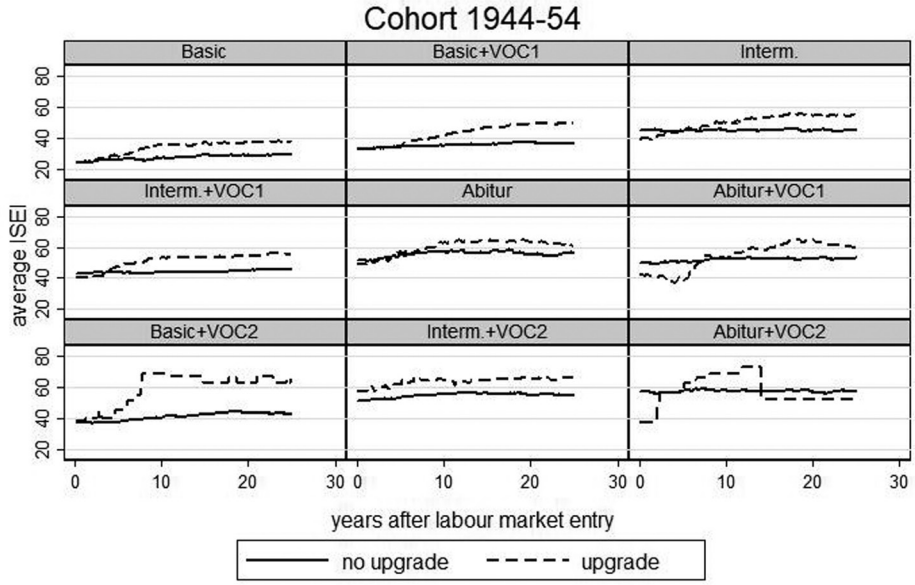


Figure 3.7: Development of average ISEI over the career cycle, by upgrading status (cohort 1944-54)

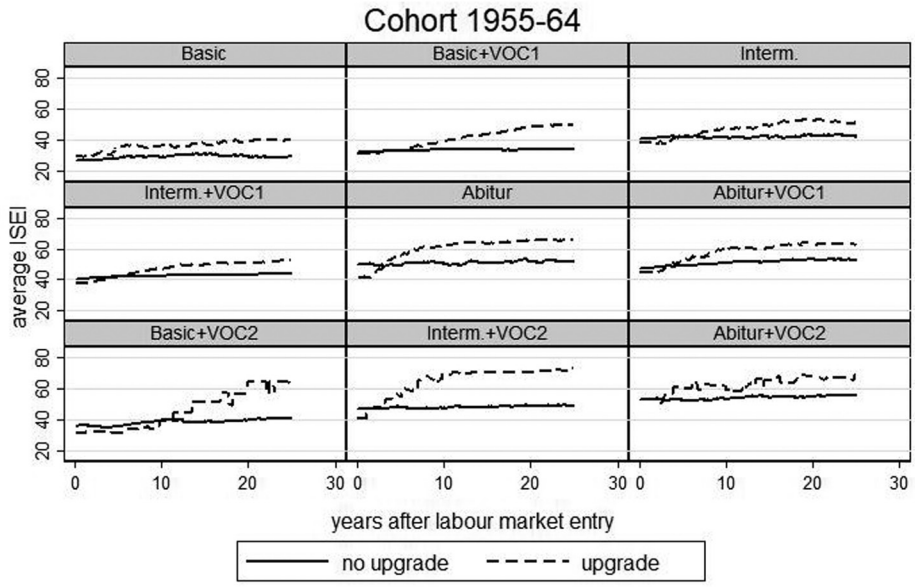


Figure 3.8: Development of average ISEI over the career cycle, by upgrading status (cohort 1955-64)

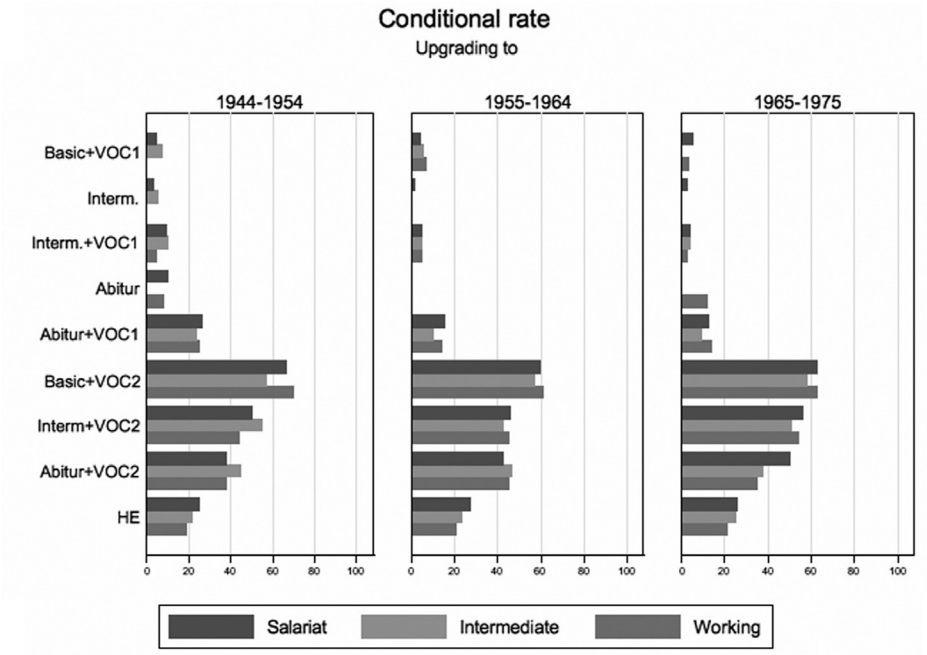


Figure 3.9: Distribution of educational upgrading destinations, by social origin

4

Employers hiring preferences: Unfolding the effects of educational and non-educational attributes on the probabilities of being hired. A vignette study of two types of jobs

Abstract: This chapter analyses the extent to which educational and non-educational attributes influence employers' hiring decisions (as positive as well as negative signals) and the extent to which screening criteria vary across types of jobs. By means of a factorial survey experiment, the role of these attributes is investigated at two different stages of the selection process: screening applicants' CVs, and shortlisting the best applicants. Horizontal differentiation (fields of study) and work experience (internship) are signals of productivity for jobs requiring codified knowledge and skills, such as professional jobs. Conversely, vertical differentiation (the level of education) is a signal of productivity for general jobs requiring less codified knowledge and skills. In line with our prediction, the importance of job seekers' characteristics does vary across types of jobs, although differences are not large. Furthermore, results also suggest that hiring preferences do not vary substantially over the selection process: characteristics that turned out to be important at the first stage are still important at later stages.

Introduction

The literature has extensively reported on the importance of educational credentials and job experience for labour market entrants' employability. But we know less about which attributes enter into employers' hiring decisions as positive or negative signals, and the extent to which screening criteria vary across types of jobs. Employers' hiring behaviour has often inferred from supply-side surveys by observing certain individuals in certain job positions. However, it is then only possible to indirectly assess which characteristics of job seekers affect employment outcomes (cf. Bernardi 2003, Scherer 2005). To better understand the micro-processes and detailed characteristics that culminate in a hiring, the point of view of those who are responsible for the hiring decision is of key importance (Bills 1988b, Bills 1990, Breen et al. 1995). It is therefore necessary to study the process of decision-making, analysing how employers evaluate and select new workers (Rivera 2012). This paper, by means of a vignette study, analyses the selection process from the employer's side, looking into the evaluation of job applicants' characteristics by employers (or those responsible for the hiring process) from a pool of fictitious job candidates applying for the same job. To keep the context constant, we concentrate on one industrial sector in Italy, which has been described as being characterized by a weak linkage between formal education and occupational destination (Schizzerotto and Barone 2006). This peculiarity should emphasize employers hiring preferences, and may leave room to other attributes not necessarily related to formal schooling.

A CV, even in its simplest form, transports multitude of information about the job applicant regarding previous education and occupational records, as well as other skills and abilities and relevant experiences and activities. Educational records exert a strong role especially at labour market entry when job candidates have not yet accumulated work experience. This information provides a number of signals about potential abilities and potential skills of the individual, some of which may be more influential than others. Therefore, it is fundamental to unpack education into narrower dimensions in order to investigate its effects (Di Stasio 2014). Job applicants, however, not only differ with respect to education-related attributes, but also with respect to other characteristics and skills, or abilities not necessarily related to formal education, such as transversal skills. In fact, transversal skills have been shown to be important predictors of socioeconomic achievement (Farkas 2003, Heckman et al.2006, Jackson 2007, Humburg and Van der Velden 2015, Dörfler and Van de Werfhorst 2009, Protsch and Solga 2015). But educational and non-educational attributes only exert a role if they are taken into consideration by recruiters. Students acquire credentials and experiences

that are expected to enhance their employment chances by signalling their skills and abilities to employers, such as levels of education, work experience, grades, or language certificates.

The importance attached to these attributes by employers, however, will also depend upon the characteristics of the job vacancy (De Wolf and Van der Velden 2001). Productivity not only depends on characteristics of employees, but on the match between required and acquired skills (Sattinger 1993). Requirements differ with the type of job. Employers, therefore, make use of these attributes in function of the specific requirements of the job vacancy: what is relevant for one job may not be important for another (De Wolf and Van der Velden 2001).

Theoretical considerations

Job allocation processes

Matching employees to jobs involves employers and job seekers coming to a positive decision about a specific job. On the one hand, there are employers who seek and evaluate job applicants; on the other hand, there are workers who seek and evaluate employers and job offers (Bills 2003). Job entry is the outcome of the matching between job seekers and available vacancies (Di Stasio 2014). The process leading to this outcome, however, is complex and delicate, with long-term implications for both employers and employees.

In order to identify the selection criteria used by recruiters during the hiring procedure the *signalling* theory provides helpful insights (Spence 1973, 1981, Weiss 1995). While screening applicants, employers can rely only on observable indicators to estimate the potential productivity and trainability of job seekers (Spence 1973, Thurow 1975). However, in which way and to which extent individual's characteristics lead to a successful job assignment is not straightforward. Productivity depends on the match of specific job requirements and the attributes of an employee (Hartog 1988, Sattinger 1993). In other words, both individual and job characteristics affect hiring processes, with consequences for the job assignment process since hiring criteria will differ between different types of jobs. Some jobs may have an optimal match with some labour suppliers, while for other jobs different characteristics may prevail (De Wolf and Van der Velden 2001).

In contemporary societies, acquired skills are among the most important criteria in the allocation to jobs, and even more so in the case of labour market entrants. The

literature distinguishes between job(sector)-specific, cognitive, and transversal skills (De Wolf and Van der Velden 2001, Protsch and Solga 2015). Job specific skills refer to skills and knowledge instrumental to a restricted set of occupations. Cognitive skills are transferable between occupations and are believed to give people the ability to adapt to new technologies and different productive environments (Hanushek et al. 2011): they should be positively evaluated in a large number of occupations. Transversal skills are generally related to personality traits, such as perseverance, sociability, rhetoric, motivation, or the ability to work with others, which may be especially important for some types of jobs, such as in the service sector (Jackson 2007, Brunello and Schlotter 2011, Protsch and Solga 2015).

The skills acquired by job applicants, however, are unknown to job recruiters at the time of hiring and most likely they will be inferred from other signals. At labour market entry, formal education is an easily observable and informative signal of acquired skills. A range of information can be derived from an educational biography, but some of this information may be more influential in the allocation of school leavers into jobs. However, the importance attached to elements of the educational biography may also depend on the characteristics of the vacancy in question.

Job assignment criteria across types of jobs

De Wolf and Van der Velden (2001) classify jobs into three groups, ranking them according to the relevance of specific skills. This classification was discussed for academic-level jobs, but it can be extended to other jobs. The first type of jobs the authors refer to are called *professional jobs*. These require an optimal match between required and acquired knowledge and skills. Access to these occupations is then dependent upon specific entry requirements such as the possession of certain educational qualifications or even specific professional licences. Job tasks then need systematic and formalized knowledge accessible only through formal training in a specific field.

A second type of job consists of occupations for which specific skills are only partially relevant. Job-related skills are not necessary, but advisable, while other skills and attributes may also be important in the hiring process. These jobs are named *sector-specific* because knowledge and skills related to the sector are the most important.

A last type of job consists of *general jobs*. These are jobs for which the possession of specific qualifications is not a relevant prerequisite. Employers instead may prefer other kinds of skills and attributes that may or may not be related to formal education.

The classification of jobs into this typology is not straightforward, however. In general, we expect hiring criteria to be increasingly flexible and variable as we move form

professional to general jobs. For jobs belonging to the professional group, employers may attach greater values to indicators that signal a close match between acquired knowledge and skills and the skills required for the job, will therefore attach more importance to attributes that signal the possession of specific skills. Only when these criteria are met, will other characteristics gain importance in the selection process, such as cognitive and transversal skills. Conversely, for jobs belonging to the general group, the possession of other skills (cognitive and transversal) should also prevail in the first phase of the hiring process, while having a clear match between acquired and required knowledge and skills should be only marginally important.

Which observable information then can employers rely on when seeking a candidate who is suitable for the job? Easily observable and informative signals on job and sector-related skills could be derived from experience in the field and from a candidate's field of study, respectively. Educational credentials vary not only in terms of acquired levels of schooling, but also in terms of diversified training (Bills 2003) meant to prepare students for more or less specific occupations. In general, we expect the importance of both characteristics to prevail in professional jobs compared to general jobs. More precisely, having a matched field of study is expected to be the first hiring requirement in order to be considered for further screening when candidates apply for professional jobs (*Hypothesis 1a*). Having an internship in the field should be another desirable attribute for professional jobs in order to be placed ahead in the applicants' queue (*Hypothesis 1b*). We expect a much weaker effect of both fields of study and internship in the hiring process for general jobs (*Hypothesis 1c*).

Previous studies have used the level of education and grades (Spence 1974, Thurow 1975, Farkas 2003, Protsch and Solga 2015) as a signal of general ability and skills. Educated job seekers are not a random sample – they will have passed through a process of selection based to a large extent on ability and effort. Similarly, having good grades may signal effort, perseverance, and cognition. These characteristics, however, could produce different signals. Having good grades and being highly educated could also signal the mastery of specific skills. Depending on the vacancy in question, employers may attach different meanings to both signals, which makes it difficult to foresee specific patterns, as pointed out by De Wolf and Van der Velden (2001). A curriculum vitae generally includes self-reported abilities, including statements on the level of job autonomy, the ability to solve more or less complex tasks, etc. When trusted by employers, this information could also be used in order to screen job applicants. The analyses test how employers' use of attributes which signal things such as cognitive skills varies between typologies of jobs.

Information on candidates' transversal skills is not easily derivable at the stage of curricula screening. This information most likely emerges at later stages of the selection process (face-to-face interview); however, if non-cognitive skills are important attributes for hiring decisions, then employers will rely on other signals that may show the possession of these skills, such as extracurricular activities (Rivera 2012) and self-reported abilities and skills. Transversal skills could be important attributes for all types of jobs. Furthermore, there are a large variety of attributes and skills that can be classified as being transversal and important for job opportunities. Some of them are related to personality traits, while others are acquired over the life course through different activities and experiences. In general, however, we expect transversal skills to be more important for general jobs than professional ones (*Hypothesis 2*). Reasons are twofold. First, employers hiring for general jobs should rely upon fewer formal entry requirements compared to professional jobs. This may push them to look for other attributes. Second, candidates applying for general jobs do not have to fulfil only tasks bounded to a specific field. Conversely, the tasks required by jobs belonging to this type should be more variable and extended, requiring therefore a larger variety of skills compared to professional jobs.

Research design

A vignette study was conducted to look into the details of employers' hiring decisions for different job types. A vignette study creates hypothetical profiles of job applicants and asks employers or human resource managers to engage in a simulation exercise that mimics a real hiring scenario. In this study, vignettes represent the profiles of school leavers competing for the same job, either a "professional job", or a "general job". Each "recruiter" evaluates applicants for only one of these positions.

Drawing on existing literature and extensive preliminary interviews with experts, we identify the dimensions and their operationalization which are expected to influence respondent's judgements on the outcome of interest. Each dimension is measured through a number of levels of theoretical relevance (for example the *dimension* "formal education" has 3 *levels* "upper secondary", "Bachelor", "Master"). The "*vignette universe*" is composed of all possible combinations of these levels of dimensions. From this universe, a set of vignettes is selected and presented to respondents. The vignette sets are chosen in a way that they maintain orthogonality, i.e. they guarantee, at least ideally, that dimensions which are correlated in real world, like educational level and certain specific skills, can vary independently in the vignettes. This orthogonal matrix is one of

the major advantages of this method as it makes it possible to separate dimensions that in the real world are correlated, avoiding the problem of multicollinearity (for an extensive application of this method on hiring behaviour see Di Stasio 2014).

Qualitative preparatory study and jobs selection

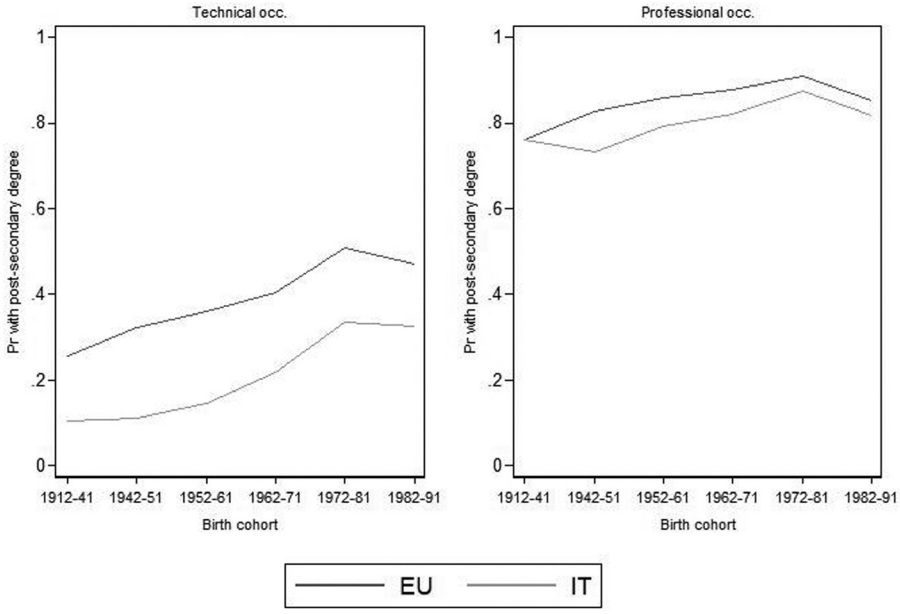
The definition of the dimensions and detailed levels is, of course, crucial. Therefore, preliminary interviews were conducted before designing the vignettes with an expert in business organization, an expert in human resources, and six representatives of the Italian industrial trade unions in six Italian provinces (Trento, Vicenza, Bergamo, Reggio Emilia, Florence, and Rome). Interviews took place between February and April 2017, and lasted about an hour and a half; they were helpful for gaining information on four issues essential for an appropriate experimental design.

Economic sector selection.

While planning an experimental design, the researcher needs to choose the level of variability they aim to manipulate, keeping constant all other sources of variation. In this study, the economic sector is kept constant. In order to increase the external validity of the design, one of the most widespread industry in Italy was chosen, namely the electromechanical industry (from NACE 24 to NACE 30). Despite the apparent variability within this sector, which ranges from mechanics to electronics, all experts agreed that the overall organization and structure of firms does not vary much between more specific classifications.

Jobs selection.

In our design, which is, not least, interested in the role of higher levels of education, jobs need to fulfil three criteria: first, jobs need to belong to different typologies, in line with what was discussed in the theoretical section, but within the same skill level; second, they need to be present in all firms in the selected industry; finally, specific credentials and licenses must not be formally required, as this would exclude the possibility to investigate in a meaningful way the effect of formal education. In other words, positions requiring specific licenses, such as psychologists or lawyers, were not considered in this design. This was to emphasise the role played by formal education in the hiring process.



Source: EU-LFS 2009

Figure 4.1: Proportion of workers with post-secondary education over birth cohorts in technical and professional occupations.

Figure 4.1 shows the proportion of workers with a post-secondary degree working as technicians and professionals across different birth cohorts in Europe and Italy (own calculation EU-LFS 2009). This is a simple way to check whether there have been variations in terms of composition in these two types of occupations over time, at least with regard to the level of education. Access to professional occupations is to a large extent limited to holders of post-secondary qualifications and we do not observe large variation either over time or between Italy and Europe. Conversely, the share of post-secondary graduates in technical occupations has increased more sharply across birth cohorts, by about 25 percentage points. This trend could be explained by both expansion of education and the changing nature of work in contemporary societies, which might have pushed employers to upgrade their educational entry requirements. Italy shows a similar trend. What varies, however, is the average proportion of post-secondary graduates, which is, in all birth cohorts, more than half compared to the European average. We decide, to focus on technical occupations (ISCO 3), for which employers' should still have a relative large degree of discretion. This should be even truer in Italy, since educational choices at the post-secondary/lower-tertiary level are almost non-existent.

More precisely, respondents were asked to choose from two jobs, one that we define as being between *professional* and *sector-specific* (production process technician) and another between *sector-specific* and *general*, where job-specific skills should not be a prime prerequisite (commercial sales representative). As suggested by the experts, all firms in this economic sector have both types of jobs. However, small firms may not have a commercial department. In such firms is generally the owner who fulfils this task.

Definition of dimensions and levels

The selection and operationalization of dimensions is a fundamental step in the vignette design. Vignettes should be carefully constructed as to include relevant factors that may affect employers' hiring decisions. Drawing on existing literature, preliminary versions of both dimensions and levels were defined. Interviews with experts were helpful in order to revise the fictitious curriculum vitae and, even more importantly, the levels within each dimension (section 4.3.2 presents the dimensions included in this analysis).

Selection of respondents

In order to arrive at realistic assessments of the recruitment process, also the selection of the "recruiters", i.e. the persons responding in the vignette study, is crucial. We carefully selected experts of the recruitment process, that is the human resource manager or the managing director. The six representatives interviewed were each asked to provide a list of ten firms to be included in the sample. Only one representative did not collaborate (Province of Bergamo) due to time constraints. Firms' selection followed two main criteria: company size (10-49;50-249;250 or more employees) and company type (mechanical *versus* electronic). In all provinces, representatives preferred to get in touch with the selected firms personally to ask them to participate in the survey. The requirement was that the survey should be filled out either by HR professionals or by the firm's owner if an HR department was not available. This was to ensure a sample of experts in job recruiting. Twenty contacted firms (40 %) agreed to participate. The composition of the final sample in terms of characteristics is shown in Table 4.10 in the Appendix. In one case the respondent was neither the HR manager nor the owner, but was the production department manager.

Experimental design: dependent and independent variables

This research focuses on the first stage of the recruitment process, when job candidates are screened on the basis of the information in their curriculum vitae (CV). The design proposed by Di Stasio (2014) was used for reasons of comparability, and two steps were

distinguished in the hiring process. Each step produces one outcome variable. First, respondents are asked to evaluate all applicants' CVs, assigning a preference to each applicant expressed as probability (ranging from 0 to 100) of hiring the candidate. In this step, job applicants who do not fulfil the main entry requirements are excluded from the further recruitment process. The best four candidates (candidates with the highest probability) were short-listed. Respondents were then asked to re-evaluate the shortlist of candidates and to order them from the one with the highest probability of being invited to a face-to-face interview to the candidate with the lowest probability. The ranking of the shortlist is the second outcome variable.

The study is based on eight vignette dimensions corresponding to characteristics commonly reported in CVs and elaborated through the qualitative interviews. Each CV is divided into two parts: in the first part information was manipulated concerning to candidate's formal credentials and experiences: namely the level of education, fields of study, having done an internship in the field, and grade point average. In the second part, candidates' self-reported skills and experiences were manipulated, namely extracurricular activities, language proficiency, communication and team-working skills, job autonomy, and problem solving skills. The operationalization of dimensions is reported in Table 4.1.

Three levels of education are considered: upper-secondary diploma, bachelor's degree, and master's degree. These are the three possible entry level qualifications for the jobs included in this study. Since we consider only medium-high level occupations, this dimension should signal employers' preference for more or less educated job seekers. Preliminary interviews with experts showed both the negative signal of bad grades and the positive signal of good grades. Grade average is therefore operationalized using a three-level variable. For candidates with an upper secondary diploma the following levels were used: 60/100 (low), 73/100 (medium), and 100/100 (high). For candidates with a tertiary degree the following levels were used: 80/110 (low); 102/110 (medium); 110/110 (high). Levels were defined using the tenth, the fiftieth, and the ninetieth percentile of the grade distribution among graduates with a technical qualification and an engineering degree (based on the ISTAT survey of graduates from 2012).

Both the level of education and grades may signal cognitive skills. However, these are still indirect measurements of cognitive skills. Since the factorial survey technique make it possible to disentangle features that in real life are correlated, we included another dimension that shows different levels of what we named 'cognitive maturity'. These levels are closely related to skills that students with different levels of education should have. More precisely, levels were operationalized using the European Qualification Framework (European Commission 2008) level descriptors which defines knowledge,

skills, and competences students should have at different stages of their educational career (descriptors included in the vignettes are presented in Table 4.1). Each descriptor shows different levels of job autonomy and problem solving. The latter are attributes that are expected to improve with higher levels of schooling.

Fields of study is operationalized including three different specializations, namely economics, electronics, and mechanics. Information on internship includes three categories: no internship, three months internship in the commercial department; or three months internship in the production department. The relevance of having a match between acquired and required sector-specific knowledge and skills should be covered by fields of study. Internship should show the importance of having job-related skills.

Language proficiency is operationalized using the Common European Framework of Reference for Languages, distinguishing between two levels (B1 and C1) indicating a medium-low and a high level of language proficiency.

The self-reported abilities and skills are meant to integrate the role of formal education and experiences. Self-reported information is also manipulated for two reasons: the most widespread format of curriculum vitae (Europass) also includes information in which job seekers present themselves through relevant experience, acquired skills, and personality traits; this information may also enter into employers' hiring preferences. Extracurricular activities and transversal skills are manipulated simultaneously. In previous research, transversal skills were often treated in the same way as attained qualifications, thus simply reporting the extent to which a candidate possesses certain skills. This procedure might be unrealistic and it may come with low validity. In the real world signals on transversal skills are often derived from other information, especially at the earliest stage of the selection process. What employers might do is to use other sources of information, such as extracurricular activities. The literature has shown, however, that extracurricular activities also have a direct positive effect on occupational opportunities (Rivera 2012). Here, therefore, both signals need to be manipulated in order to detect whether extracurricular activities have an independent effect or whether it is the combination of extracurricular activity and transversal skill that enter into employers' hiring preferences. *Ad hoc* scenarios are used in which job applicants vary with respect to transversal skills, extracurricular activities and the combination between the two. The different profiles are reported in Table 4.1. In line with previous studies (Humburg and Van der Velden 2015), two transversal skills are included: communication and initiative, and team-working skills.

Table 4.1: Dimensions and levels used in the vignettes, by types of skills

Cognitive		
Level of education	1.	Upper-secondary diploma
	2.	Bachelor's degree
	3.	Master's degree
Grades	1.	Low (60/100, 80/110)
	2.	Medium (73/100, 102/110)
	3.	High (100/100, 110/110
Cognitive maturity	**Profile A**: I have proven good skills to solve complex problems in full autonomy in order to develop new knowledge and strategies, even in activities exposed to unpredictable changes. **Profile B**: I have proven good skills to solve specific problems by applying methods, tools and information that I have learned in order to carry out the required activity autonomously. **Profile C**: I have proven to have good skills to solve recurring problems, especially under the supervision of a superior.	
Specific		
Fields of study	1.	Economics
	2.	Mechanics
	3.	Electronics
Internship in a firm	1.	No
	2.	Yes, 3 months in the commercial department
	3.	Yes, 3 months in the production department
Transversal		
Communication skills	**Profile A**: I have excellent communication skills. Has been several years I'm a member of a **theatre group**. Given the continuing training and the numerous tether show, I have developed communication skills **Profile B**: I have excellent communication skills. Has been several years I'm a member of an **orchestra**. Given the continuing training and the numerous concerts, I have developed communication skills **Profile C**: I have excellent communication skills **Profile D**: I have fair communication skills **Profile E**: "This section was not fill out"	
Team working and initiative skills	**Profile A**: I have excellent team-working and initiative skills. Has been several years I'm making **sailing races**. Thanks to this activity I have developed team-working and initiative skills. **Profile B**: I have excellent team-working and initiative skills **Profile C**: I have fair team-working and initiative skills **Profile D**: "This section was not fill out"	

Vignette sample design and experimental strategy

By combining all vignette dimensions and levels, the vignette universe consists of 9720 possible combinations (3^5 x 2 x 4 x 5). In order to reach unbiased estimates, all combinations should be investigated as only the matrix of the full factorial is perfectly orthogonal. The number of possible combinations, however, is too large to be completely

administered in the survey. It is important, therefore, to identify the fraction of the universe of possible combinations that maximizes the information that one wants to gain. Scholars have discussed and compared the statistical power of different techniques in order to identify the fraction of vignettes to be selected. More efficient designs imply that fewer vignettes are needed to reach the same amount of statistical precision and power compared to less efficient designs (Atzmüller and Steiner 2010, for a review of methods see Auspurg and Hinz 2015).

The most prominent measure of design efficiency is the so called *D-efficiency*. It optimizes both orthogonality and level balance, which are both attributes that enhance statistical precision (Auspurg and Hinz 2015). While generating the D-efficient sample, we specified all two-way interactions among the various dimensions, since all appeared to be plausible and likely. With the help of the software package SAS we generated a fraction of 713 vignettes with the orthogonalization of all two-way interactions, from the full factorial universe.

Subsequently, the sample was split into 55 sets of 13 vignettes each, again oriented toward a maximum orthogonality and level balance within the single blocks. Orthogonality and level balance of the original sample are shown in Tables 4.2 and 4.3. The 55 sets were then assigned randomly to respondents. These two procedures ensure the internal validity of the factorial survey experiment design.

Only some of the 55 sets were administered. The final (pooled) sample (including professional and general jobs) and the sample for professional jobs lose statistical precision compared to the original sample, and perfect orthogonality of the dimensions is not guaranteed. However, correlation between dimensions does not exceed 0.15. The situation is less favourable with regard to the general job sample, where we lose precision due to the small sample size. Further, correlation between dimensions in some instances reaches 0.30, indicating that there are some combinations of dimensions and levels that are more likely to occur compared to others. Note that if two dimensions are slightly correlated this occurs by pure chance, since vignette sets were randomly assigned to respondents. This may, however, undermine the internal validity of our estimates, since dimensions are not entirely orthogonal. Fisher's exact tests were run in order to test whether dimensions with a relatively too large Cromer's V correlation coefficient were statistically independent. Indeed they are. We will, however, also run multivariate analysis at a later stage of this on-going study.

Vignettes were incorporated into a web-survey with the assistance of a programmer. A screenshot of the vignettes is provided in Figure 4.2 in the appendix. After a brief introduction in which the main parts of the survey were presented, respondents were

asked to choose from two jobs. “Recruiters” were explicitly instructed to choose the job they were more familiar with among the two alternatives: production process technician or commercial sales representative. Respondents were also informed that the fictitious CVs referred to school leavers without work experience (except internship). Each respondent had to evaluate 15 vignettes. The first two vignettes were standardized across all respondents and presented either more positive or more negative attributes. After the simulation, respondents were asked to fill-out a questionnaire.

Analytical strategy

Hiring propensity

To estimate the effects of candidates’ attributes on employers’ hiring propensity, we employ fixed effects models, including respondent-specific intercepts. The reason for choosing fixed effects models rather than random effect models, also widely employed in factorial survey experiments, are twofold: first we have a relatively small sample size within each of the two jobs, especially with regard to job of commercial sales representative (six respondents, 78 vignettes); second, the respondents’ sample size varies in terms of characteristics and due to the small *N* we are unable to control for all second-level variables and for interactions in order to check for variation between respondents’ and firms’ characteristics. Fixed effects models make it possible to control for unobserved heterogeneity at the respondent level; nevertheless, they do not take into account interaction effects between Level 1 and Level 2.

Table 4.2: Cramer’s V correlation coefficients of the vignette’s factors based on original and final samples

Original sample (713 vignettes)								
	Internship	Edu. Lvl	FoS	GPA	English	Com.sk.	Tw sk	Cognitive
Internship	1							
Edu. Lvl	.009	1						
FoS	.004	.012	1					
GPA	.005	.007	.007	1				
English	.005	.002	.005	.009	1			
Com. Sk.	.011	.011	.009	.010	.003	1		
TW sk	.012	.008	.009	.005	.008	.012	1	
Cognitive	.006	.005	.010	.005	.007	.012	.011	1

Table 4.2: Continued

Professional job sample (182 vignettes)								
	Internship	Edu. Lvl	FoS	GPA	English	Com.sk.	Tw sk	Cognitive
Internship	1							
Edu. Lvl	.094	1						
FoS	.115	.045	1					
GPA	.083	.112	.063	1				
English	.114	.057	.086	.042	1			
Com. Sk.	.114	.126	.110	.089	.142	1		
TW sk	.151	.082	.116	.158	.094	.144	1	
Cognitive	.134	.063	.092	.072	.074	.106	.126	1
General job sample (78 vignettes)								
	Internship	Edu. Lvl	FoS	GPA	English	Com.sk.	Tw sk	Cognitive
Internship	1							
Edu. Lvl	.088	1						
FoS	.123	.088	1					
GPA	.131	.129	.113	1				
English	.048	.129	.191	.019	1			
Com. Sk.	.208	.215	.095	.218	.143	1		
TW sk	.128	.111	.150	.129	.301	.254	1	
Cognitive	.173	.167	.138	.202	.132	.160	.203	1

Table 4.3 Balancing between vignette's levels in the original and final samples

	Original sample		**Professional job sample**		**General job sample**	
	N	%	N	%	N	%
Internship						
- No	238	33.4	75	36	31	34
- Yes, 3 months in the commercial department	238	33.4	61	29	26	29
- Yes, 3 months in the production department	237	33.2	74	35	33	37
Educational level						
- Upper secondary diploma	237	33.2	74	35	32	35
- Bachelor's degree	236	33.1	72	34	33	37
- Master's degree	240	33.7	64	31	25	28
Field of study						
- Economics	236	33.1	76	36	32	36
- Electronics	242	33.9	71	34	27	30
- Mechanics	235	33.0	63	30	31	34

Table 4.3 Balancing between vignette's levels in the original and final samples

	Original sample		Professional job sample		General job sample	
Grade						
- High	237	33.2	76	36	31	34.5
- Medium	236	33.1	71	34	31	34.5
- Low	240	33.7	63	30	28	31
English						
- B1	356	49.9	107	51	46	51
- C1	357	50.1	103	49	44	49
Communication skills						
- Skill excellent + matched extracurricular	142	19.9	38	18	16	18
- Skill excellent + not matched extracurricular	142	19.9	34	16	16	18
- Skill excellent	142	19.9	48	23	23	24
- Skill fair	145	20.3	52	25	21	13
- Nothing	142	19.9	38	18	14	16
Team-working skills						
- Skill excellent + matched extracurricular	176	24.7	45	21	18	20
- Skill excellent	180	25.3	60	29	24	27
- Skill fair	178	25.0	43	21	23	25
- Nothing	179	25.0	62	29	25	28
Cognitive skills						
- high	239	33.5	76	36	30	33
- Medium	236	33.1	59	28	28	31
- Low	238	33.4	76	36	32	35

As discussed earlier, some statistical precision of the original sample was lost in the final sample. This may affect the internal validity of our estimates, since dimensions are not entirely orthogonal. With perfect orthogonality between dimensions, we would expect bivariate analysis and the coefficients obtained from the full model to yield to the same results. In order to check the extent to which the correlation of dimensions undermines the internal validity of our design, we run both bivariate analysis as well as the full model analysis.

We also collected information on the order in which vignettes were presented to respondents. This is meant to control for fatigue effects or cognitive overload during the evaluation process. However, one dimension (English proficiency) is highly correlated with the vignettes' order variable, which would lead to biased estimates. Since there is no difference by including or excluding the order in which vignettes were shown to respondents, we preferred to drop the vignettes' order variable rather than English proficiency.

Ranking preferences

Recruiters are asked to rank four shortlisted candidates. Ranking preferences are estimated using rank-ordered logistic regression models, which is an extension of conditional logit models (Allison and Christakis, 1994). More precisely, ranking is modelled as a sequence of choices: first, employers evaluate all the shortlisted applicants assigning one applicant to a rank, then a second choice is made with the remaining applicants, until the last applicant is assigned to a rank. Each set of vignettes represent the profiles of applicants that are considered at each sequential stage of the ranking process, similarly to *risk sets* in event history analysis (Di Stasio 2014): job applicants are at risk of experiencing the event of being assigned to a rank. Whenever an applicant is ranked, the corresponding vignette is dropped from the alternatives.

Following Allison and Christakis (1994: 201), Y_{ij} is the rank given to vignette *j* by employer *i*. Since employers are asked to rank the four shortlisted applicants, Y_{ij} can take the values 1 to 4, where 1 is the best rank and 4 is the worst. The model assumes an underline utility model (*U*): employer *i* will give vignette *j* a better rank than vignette *k* whenever $U_{ij}>U_{ik}$. Each utility function is the sum of a systematic component μ_{ij} and a random component ε_{ij}. The systematic component represents a set of explanatory variables and can be expressed in a linear function.

$$\mu_{ij=}\beta_j x_i + \gamma z_j + \boldsymbol{\theta}\mathbf{w}_{ij}$$

where x_i contains variables that describe employers and are constant over vignettes; z_j contains characteristics of vignettes; w_{ji} contains variables that describe a relation between vignette *j* and employer *i*, thus interactions between characteristics of employers and characteristics of vignettes.

Each choice in the sequential choice model is governed by a logit model. The first step is to choose the most preferred candidate among the shortlisted candidates. Once the first choice is made, one can model the probability that the employer will choose candidate *m* from the remaining candidates. This sequential choice process continues until the last two candidates remain in the alternative set. This method has been used also in previous research dealing with hiring preferences (de Wolf and Van der Velden 2001, Di Stasio 2014).

Analyses

Candidates' characteristics and hiring propensity

Table 4.4 reports results for employers' hiring preferences. At this very first stage of the screening process, candidates that do not meet the basic criteria should be screened out. We predicted that hiring preferences are likely to vary across types of jobs. More precisely, for professional jobs the match between required and acquired skills should be the first important requirement while other characteristics, such as cognitive and transversal skills, should be of a minor importance at this stage of the hiring process. Conversely, for general jobs cognitive and transversal skills should already matter at this stage of the selection process. Columns 1 and 3 shows results for the bivariate analysis, in which the effect of each dimension is estimated separately. Columns 2 and 4 show results for the full model, in which all dimensions are included simultaneously. We observe some variation which confirms that dimensions are not perfectly orthogonal; however, the sign and size of the effects do not vary substantially, especially with regard to the key results. The remainder of this section will interpret results from the full models which are net of all other dimensions.

In line with our expectations, the match between required and acquired job-related knowledge and skills matters to a larger extent for professional than general jobs. Having done an internship in a related field turned out to be an important attribute only for candidates applying for the position of production process technician and not for commercial sales representative. The probability of being hired increases by 7 percentage points. It is not having job experience in general that matters, but having experience in the field. A matched field of study is a necessary entry requirement especially for the professional job. Having a mismatched field of study decreases the probability of a candidate being hired by 37 percentage points. Results show that having a specialization in economics rather than mechanics or electronics also penalizes candidates applying for the job as commercial sales representative. The size of the effect, however, is almost half compared to professional jobs. In this case, field of study seem to signal the importance of sector-specific skills.

The level of education matters for both types of jobs: job candidates with a Bachelor's and a Master's degree are preferred over candidates with an upper secondary diploma. The effect, however, is much stronger for the general than for the professional job. Having a Master's degree increases the probability of being hired for commercial sales representative by 19.5 percentage points. The effect is almost two-third lower for the professional job.

Bad grades have a negative effect on hiring propensity for both types of jobs; although the effect turned out to be significant only for the professional job. Interestingly, good grades do not improve the chances to be hired; it looks as if grades work rather to sort out less appealing candidates.

Vignettes also include another dimension that reports the level of job autonomy and problem solving skills, what we named cognitive maturity. The three categories refer to different levels of cognitive maturity that students should have at different stages of their educational career. The effect turned out to be significant only for the professional job. More precisely, being able to solve recurring problems only under the supervision of a superior, which should signal a low level of cognitive maturity, instead of being more autonomous and able to solve more complex tasks, decreases the probability of being considered for hire by 6 percentage points. The bivariate analysis does not show this effect, however. Surprisingly, English proficiency matters more for the professional than the general job.

We do not observe a clear effect of transversal skills on hiring propensity. We find that having excellent team-working and initiative skills matters for professional jobs. This effect is reduced when associated with an extracurricular activity. Note that within each cell the number of cases is rather small, which might result in not significant effects. Undoubtedly, our hypotheses that transversal skills only matter for general jobs and not for professional jobs seems to be rejected. In general, we cannot say there is a clear preference for candidates with both transversal skills and extracurricular activities, at least at this stage of the hiring process.

Table 4.4: Effect of candidates' characteristics on employers hiring propensity across types of job. Fixed effects models

	Bivariate Model	**Full model**	**Bivariate Model**	**Full model**
Internship (ref: No)				
- Yes, 3 month in the commercial department	5.1	3.6	3.7	2.1
- Yes, 3 months in the production department	9.4**	7.1**	.84	2.6
Educational level (ref: Upper secondary diploma)				
- Bachelor's	3.5	6.2*	11.9**	9.4**
- Master's	6.5	7.2*	18.8***	19.5***
Field of study (ref. Mechanics)				
- Economics	-37.2***	-37.1***	-18.7***	-20.2***
- Electronics	.27	-1.2	-1.9	-3.7
Grade (ref: medium)				
- High	-.81	-1.2	5.2	3.0
- Low	-7.3	-9.4**	-5.5	-6.6
English (ref: B1)				
- C1	8.4**	5.8**	6.5	2.6

Table 4.4: Effect of candidates' characteristics on employers hiring propensity across types of job. Fixed effects models

	Bivariate Model	Full model	Bivariate Model	Full model
Communication skills (ref: no)				
- Fair	8.2	6.3	-.75	-3.9
- Excellent	-3.6	-1.1	6.6	-2.4
- Excellent+ unmatched extracurr.	3.8	1.7	7.6	4.7
- Excellent+ matched extracurr	7.7	5.9	3.1	-2.5
Team-working (ref: no)				
- Fair	1.3	5.4	-3.1	1.5
- Excellent	9.7*	8.8*	3.5	5.9
- Excellent+ matched extracurr	-.12	5.8	1.8	4.7
Cognitive development (ref: high)				
- Medium	-.94	-5.0	-8.5*	-6.0
- Low	-2.7	-6.0*	-5.8	-3.1
Constant	-	57.2	-	51.4
N vignettes	182		78	
N respondents	14		6	

Candidates' characteristics and the likelihood of being invited to a job interview

In the first simulation exercise, employers were asked to assign a preference to each candidate. Then employers were asked to rank a shortlist of the best four candidates, from the candidate they would invite first to a job interview to the candidate they would invite last. To analyse ranking criteria, we estimate rank-ordered logit models.

Earlier, we reasoned that at later stages of the hiring process other attributes may gain importance. The shortlist is made by more homogeneous candidates since they have already been screened based on some characteristics. Table 4.5 shows the distribution of the characteristics among the shortlisted. In line with results from the previous section, there are some important differences between types of jobs. Candidates with an upper secondary diploma diploma are more underrepresented in the general than in the professional job (12 *vs* 32%); conversely, candidates without internship are more underrepresented in the professional than in the general job (20% and 33%, respectively). More than 50 percent of the shortlisted in the general job have a master's degree, compared to 34 percent in the professional job. Having a high level of cognitive maturity, conversely, is more common among those shortlisted for the professional job (43%) compared to those shortlisted for the general one (33%).

Table 4.6 shows chances to be shortlisted. Only 18 percent of applicants without internship passed the first screening process for the professional job compared to 32

percent for the general job. Conversely, only 11 percent of job candidates with an upper secondary diploma diploma applying for the general job passed the first screening process, compared to 30 percent of candidates applying for the professional job. With regard to fields of study, only two percent of candidates with a qualification in economics were shortlisted for the professional job compared to 15 percent for the general job. In both types of job, candidates with bad grades did not make the second stage of the hiring process more often than candidates with medium or high grades.

Table 4.5 Distribution of characteristics among the shortlisted. Percentage shown for the pooled sample, and the two types of jobs separately.

	Professional (*N* 56)	General (*N* 24)
Internship		
- No	20	33
- Yes, 3 month in the commercial department	39	25
- Yes, 3 months in the production department	41	42
Educational level		
- Upper secondary diploma	32	12
- Bachelor's degree	34	33
- Master's degree	34	54
Fields of study		
- Economics	2	17
- Electronics	43	29
- Mechanics	55	54
Grades		
- High	40	33
- Medium	39	50
- Low	21	17
English		
- B1	43	54
- C1	57	46
Communication skills		
- No	18	8
- Fair	23	25
- Excellent	14	29
- Excellent+ unmatched extracurr.	14	21
- Excellent+ matched extracurr	30	17
Team-working		
- No	21	21
- Fair	18	21
- Excellent	39	21
- Excellent+ matched extracurr	22	37
Cognitive maturity		
- High	43	33
- Medium	27	29
- Low	30	38

Table 4.7 reports the effects of candidates' characteristics on the odds of being ranked higher than the reference category, and thus of being more likely to be invited to a job interview. Consistent with what we already discussed for the previous stage of the hiring process, we find similar results with regard to the ranking of applicants. More precisely, candidates with an internship in the field are still ranked ahead only when the vacancy regards the professional job. Field of study matters for both types of jobs; however, with regard to the professional job, candidates without a matching field of study were already screened out from the hiring process in the previous stage.

Having a specialization in economics instead of mechanics or electronics still penalizes candidates applying for the general job. The level of education does not affect employers' ranking preferences for the professional job, while it does matter for the general job. For production process technicians, job candidates with a tertiary degree are not more likely to be ranked ahead compared to job candidates with an upper-secondary qualification; however, employers do prefer candidates with a high level of cognitive maturity, which is generally associated with cognitive skills students should have at the end of tertiary education. Cognitive maturity among the professional job affects the hiring process more at this second stage than at the first stage. Having bad grades still penalizes job candidates applying for the professional job.

Again we do not find clear preferences for candidates with high levels of transversal skills when employers have to rank a shortlist of applicants. In line with results shown in the previous section, candidates with excellent team-working and initiative skills are ranked ahead; however, the effect disappears when associated with a matched extracurricular activity.

Table 4.6: Progress of applicants through the hiring stages: transition rates by characteristics (row percentage shortlisted/applied)

	Professional (N 56)	**General (N 24)**
Internship		
- No	18	32
- Yes, 3 month in the commercial department	36	23
- Yes, 3 months in the production department	38	38
Educational level		
- Upper secondary diploma	30	11
- Bachelor's degree	31	32
- Master's degree	33	48
Fields of study		
- Economics	2	15
- Electronics	41	26
- Mechanics	51	52
Grades		
- High	35	32
- Medium	35	43
- Low	21	16
English		
- B1	26	32
- C1	36	29
Communication skills		
- No	26	14
- Fair	34	40
- Excellent	23	42
- Excellent+ unmatched extracurr.	23	31
- Excellent+ matched extracurr	45	25
Team-working		
- No	25	26
- Fair	23	21
- Excellent	48	28
- Excellent+ matched extracurr	27	50
Cognitive maturity		
- High	39	33
- Medium	25	25
- Low	28	34

Table 4.7: Effect of candidates' characteristics on being invited to a job interview. Rank-ordered logistic regression models

	Professional	General
Internship (ref: No)		
- Yes, 3 month in the commercial department	.59	-.53
- Yes, 3 months in the production department	1.09**	.82
Educational level (ref: Upper sec.)		
- Bachelor's	.15	1.45*
- Master's	.33	2.09***
Field of study (ref. Mechanics)		
- Economics	-4.08***	-1.48**
- Electronics	-.62	-1.24*
Grade (ref: medium)		
- High	..22	.18
- Low	-1.03**	-.69
English (ref: B1)		
- C1	.53	-.85
Communication skills (ref: no)		
- Fair	.40	1.05
- Excellent	-.57	.61
- Excellent+ unmatched extracurr.	-.22	1.48
- Excellent+ matched extracurr	.75	-.09
Team-working (ref: no)		
- Fair	.32	-.38
- Excellent	1.06**	-.43
- Excellent+ matched extracurr	.64	.43
Cognitive development (ref: high)		
- Medium	-1.35***	.09
- Low	-1.03**	.81

Respondents self-reported hiring preferences

Participating employers were also asked to fill out a short questionnaire after the vignettes in which we asked two questions on their hiring preferences. In Question 1, respondents were asked to evaluate the importance of a set of information for hiring decisions. In Question 2 they were asked to evaluate the importance of a similar set of information, but this time in order to screen out job applicants. In Question 2, each dimension was formulated with a negative nuance (e.g. having low grades). In both questions, respondents had to assign a value ranging from 1 (not important at all) to 10 (very important) to each dimension. Respondents were instructed to think of the job they chose for the selection process.

Table 4.8 reports results for Question 1. In general, results are in line with our expectations and with the results we presented in the simulation, but with some

differences. In line with the results of our simulation, internship, fields of study and grades are more important attributes for production process technician than for commercial sales representative position. The level of education, conversely, matters more for the general job than for the professional job. Differences however, are rather small. Note that the simulation design and the questionnaire are not directly comparable, since only in the questionnaire do we assess the importance of different dimensions for hiring decisions, without investigating the different levels within each dimension.

In line with our prediction, transversal skills and extracurricular activities turned out to be important attributes, especially for commercial sales representative. The mean differences are significant. In the vignette study, however, we do not observe these differences. This could be related to the design we tested in our simulation exercise. To recall, we manipulate transversal skills and extracurricular activities simultaneously; however, we had to focus only on specific transversal skills and on specific extracurricular activities. This may come with some limitations: first, screening more than one candidate with the same descriptor (combination of transversal skill and extracurricular activity) could be unrealistic; second, the effect of extracurricular activity could be affected by employers' preferences, since we only have two types of activity in our design and only a rather small sample of employers; third, we manipulate a small number of transversal skills.

Table 4.8: Employers' self-reported hiring preferences. Importance of candidates' characteristics for hiring decisions.

	Professional	**General**	**Difference and t-test**
Internship	6.7	7.5	-.76
Level of education	8.5	7.9	.57
Field of study	8.3	8.8	-.45
Grades	5.8	6.9	-1.1
Transversal skills	9.3	8.1	1.2**
Problem solving	8.5	8.4	.10
Job autonomy	8	7.6	.42
Extracurricular act.	7.2	5.3	1.9*

Table 4.9: Employers' self-reported hiring preferences. Importance of lacking certain characteristics for rejection probability.

	Professional	General	Difference t-test
No work experience in the field	5.6	6.4	-.80
Low level of education	9	8	1.0
Unmatched field of study	6.7	8.2	-1.5
Lacking sector-specific skills	6.5	8.9	-2.4**
Low grades	4.3	5.7	-1.4
Low results in standardized cognitive test	6.2	5.8	.40
Lacking desired personality traits	8.8	7.2	1.6
Irrelevant work experience	4.3	5.5	-1.2

Table 4.9 shows results for Question 2. For each attribute, respondents had to indicate the extent to which it matters for rejecting job applicants. Since attributes are formulated with a negative nuance, they refer to potential candidates lacking certain characteristics. Again we observe that lacking work experience in the field, having a mismatched field of study, and lacking sector-specific skills affect the rejection process for production process technician to a larger extent than for the commercial sales representative. Conversely, having a low level of education, bad results in cognitive test, and lacking desired personality traits are slightly more important for commercial sales representative than for production process technician. Compared to Question 1, differences between types of jobs, in some instances, are slightly more pronounced; nevertheless, they are still rather limited.

Conclusion and discussion

In this chapter, by means of a quasi-experimental design – the so-called vignette study - we gained insights in the micro-processes leading to a hiring transaction, focussing on employers in the electromechanical industry. We assessed the extent to which different skills are used as signals in the hiring process and whether hiring preferences differ between types of jobs. We distinguish between two job-types: one that belongs to the professional typology (*production process technician*) and the other that belongs to the general typology (*commercial sales representative*).

We investigate two different stages of the hiring process: the screening of applicants' CVs and the ranking of a shortlist of the best four applicants. Together these two stages provide insights on employers' hiring decisions before selected candidates will be given a job interview.

In line with previous studies, we reasoned that hiring opportunity is not only dependent upon characteristics of job seekers, but also on characteristics of the vacancy for which the selection has to be made. Following this argument, we hypothesized that for vacancies in which job tasks are clearly defined (*professional jobs*), attributes signalling the match between acquired and required knowledge and skills is what employers will rely on. Only when this criterion is met, may other attributes enter into employers' hiring preferences. Conversely, for vacancies in which job tasks are only broadly defined and may involve multiple types of skills (*general jobs*), employers may assign greater importance to applicants' attributes showing skills transferable to different tasks, such as cognitive and transversal skills.

With regard to production process technicians, results are in line with our prediction. We found that a matching field of study, which should signal the possession of sector-related skills, is a prerequisite in order to be considered for a job. Almost none of the shortlisted applicants had a mismatched field of study. Having done an internship in the field, which should signal the possession of job-related skills, is another important prerequisite in order to be placed ahead in the applicants' queue. A bachelor's or master's degree, rather than a upper secondary diploma enhances hiring propensity, but it does not affect the ranking on the shortlist. When it comes to a ranking of the candidates, however, employers prefer job candidates with a level of cognitive maturity generally associated with university graduates. In other words, being able to solve complex tasks in full autonomy is seen as a desirable characteristic when ranking candidates. Cognitive maturity enters more into employers' hiring preferences when job candidates have already been screened on the basis of other attributes, such as field of study. Grades also turned out to influence the hiring process for the production process technician, but they serve to screen out the low achievers rather than giving any premium to high achievers. These results are also substantiated by results obtained by employers' self-reported hiring preferences.

With regard to commercial sales representative, results are only partially in line with our expectations. On the one hand, job and sector-related skills are less important for commercial sales representative position compared to production process technician, especially having gained work experience through an internship. On the other hand, for commercial sales representative the level of education appeared to be the main requisite in order to be placed ahead in the applicants' ranking, suggesting that vertical differentiation is an important signal of productivity for this type of job. But we do not find any evidence supporting our hypothesis on the importance of transversal skills for this type of job. This could be related either to the design we proposed, which might

have not worked as we expected (too few transversal skills, too complex scenarios, wrong extracurricular activities, etc.), or to the small sample size. Note that dimensions reporting information on transversal skills and extracurricular activities have more levels compared to the other dimensions, which further reduces the sample size within each cell. Results from the employers' questionnaire, however, do show significant differences in employers' preferences for both transversal skills and extracurricular activity between the two types of jobs, in line with our reasoning, but differences are limited in size.

In line with previous studies, we can conclude that economically important skills are not unidimensional. Conversely, the extent to which skills are perceived as productive by employers depend on the match between required and acquired skills (Sattinger 1993). School leavers' skill profiles differ with respect to the emphasis on particular types of skills, such as job(sector)-related, cognitive, and transversal. Their chances to be selected for the job they are applying for depend therefore on the importance of some types of skills for performing the job.

Some scholars argued that skills and education become ever more important (Allen and de Grip 2012), but that especially specific skills taught in vocational programmes are at risk of becoming quickly outdated in rapidly changing globalized economies. The education and training system should therefore prepare students with general and transversal skills that are more transferable between economic sectors and jobs and prepare workers better for upskilling later in life (Hanushek et al. 2011). Also the literature on returns on skills and credentials has increasingly considered transversal skills as important prerequisites for in the labour market. Studies showing the extent to which this is actually the case are still scarce, in part due to the difficulty of operationalizing transversal skills in a meaningful way.

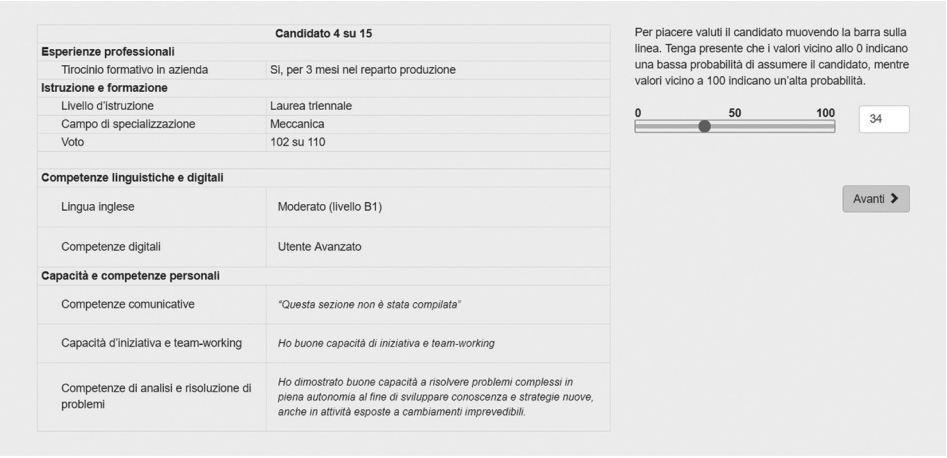
Results from our research, however, confirm the importance of specific skills and qualification, showing how employers still prefer job candidates with specific and job-related skills over candidates with higher levels of general skills. Beyond this very specific sector, from other research we know that for the largest majority of jobs, educational credentials and educational specializations seem to be still the major criteria for labour market success, especially at labour market entry. This does not mean that general/transversal skills are irrelevant. It means, however, that specific skills in some vocational subjects still matter for labour market outcomes, especially when job tasks are clearly defined. Therefore we are critical about the idea that general or transversal skills are replacing or even overtaking the role of formal education, but see an important role in providing specific vocational training also on the tertiary level, especially in the course of educational expansion.

Our study provided a piece of evidence also on these larger sets of questions. It has the strength to assess the school-to-work transition process employing a quasi-experimental design focussing on the employer side, which is still not a common approach in this field of research. The choice to involve only real experts in the selection of personnel enhances both the internal and external validity of our results. The study is not free of limits, though. Especially the rather small sample size could reduce the precision and power of the presented effects. Future studies will help to overcome this.

Appendix

Table 4.10: Descriptive statistics (employers and firms' characteristics)

Characteristics	**%**
Province	
- Ancona	5
- Reggio Emilia	20
- Trento	30
- Treviso	5
- Varese	10
- Vicenza	25
- Monza	5
Age	
- 30-40	32
- 40-50	42
- 50+	26
Gender	
- Male	70
- female	30
Firm size	
- 10-49	15
- 50-99	10
- 100-249	20
- 250-499	10
- 500+	45
Multinational corporation	
- Yes	50
- No	50
HR department	
- Yes	80
- No	20
Economic sector	
- Mechanics	50
- Electronics	30
- Unspecified	20
Level of education	
- Lower than tertiary education	25
- Tertiary education	75
Respondent's position	
- HR	70
- Employer	25
- Other	5



Candidato 4 su 15	
Esperienze professionali	
Tirocinio formativo in azienda	Sì, per 3 mesi nel reparto produzione
Istruzione e formazione	
Livello d'istruzione	Laurea triennale
Campo di specializzazione	Meccanica
Voto	102 su 110
Competenze linguistiche e digitali	
Lingua inglese	Moderato (livello B1)
Competenze digitali	Utente Avanzato
Capacità e competenze personali	
Competenze comunicative	*"Questa sezione non è stata compilata"*
Capacità d'iniziativa e team-working	*Ho buone capacità di iniziativa e team-working*
Competenze di analisi e risoluzione di problemi	*Ho dimostrato buone capacità a risolvere problemi complessi in piena autonomia al fine di sviluppare conoscenze e strategie nuove, anche in attività esposte a cambiamenti imprevedibili.*

Figure 4.2: Screenshot of vignettes shown to respondents in the online survey

5

Ethnic Peer Pressure or School Inequalities? Ethnic Concentration and Performance in Upper-Secondary Schools

Abstract: This chapter provides evidence for the ethnic concentration effect on natives' and non-natives' performance in mathematics and reading in upper secondary schools in the North and Centre of Italy, where the large majority of immigrants is concentrated. Once schools and compositional controls are included in the models, results show that the ethnic concentration effect on students' achievement is non-linear and negative effects might occur only once a rather high and empirically still rare concentration of immigrants is reached. The misspecification as linear effect will lead to wrong conclusions and consequently, to wrong policy implications. Further, it is shown how immigration affects differently natives and non-natives, only in vocational schools, where social problems and exclusion tend to concentrate. Last but not the least, results show the overrepresentation of non-native students in vocational schools, with a low quality teaching, and with a large concentration of students from the most disadvantaged social strata.

Introduction

Since the early 1990s, Italy has turned into an important destination for international migration. This rapid growth has enhanced the public concern over the assimilability of newcomers. Education is seen as a key factor for successful integration, thus, schools face the increasingly difficult challenge to include immigrant children, without slowing down natives' performance, at the same time. In the past years, the foreign population in Italian upper secondary schools had increased from 1.1 percent in 2001 to 6.6 percent in 2013 (MIUR 2013), with a very unequal distribution among different school types. The proportion of immigrant students in vocational schools (in 2013) is more than twice, compared to general and technical schools. In 2010, the Italian Minister of Education had established a threshold of 30 percent as a maximum proportion of immigrants in each classroom. Behind this threshold, there is an idea that too many immigrants within a classroom may negatively influence non-natives' as well as natives' performance, due to language and cultural barriers. Students with an immigrant background are more at risk of drop-out and they often have language problems. As a result, too many immigrant students in a classroom may slow-down the average learning of all students, both natives and non-natives (MIUR 2010). At the same time, teachers may adjust their teaching to the level of these students and use a large proportion of their time for students with extra needs, neglecting good students. The reason why this threshold was chosen is unclear and certainly not based on empirical evidence, however. This chapter fills this gap by providing insights for upper secondary schools and allowing for non-linearity of the effects.

Italy is characterized by a relatively early tracking. Strong social-origin, as well as immigration status effects in the type of upper secondary school attended, are reported by many scholars (Checchi and Flabbi 2007, Azzolini and Barone 2012). The reason is that in Italy there is not a formal system of teachers' recommendation and students can choose any type of school, irrespective to previous performance. Early differentiation was also shown to negatively affect the performance of students that come to school with language and social deficits (Entorf and Lauk 2008), exacerbating, therefore, the low school performance of the most disadvantaged, among which students with an immigrant background.

To the best of our knowledge, only two studies on the immigrant concentration effect on students' learning has been carried out in Italy so far (Contini 2013, Ballatore et al. 2018); however, both papers focus on primary and lower secondary education,

where the training offer do not change across schools, thus, were students have not been sorted into different tracks yet.

The contribution of this chapter is threefold: first, it extends the existing literature with further evidence on the association between the school's ethnic concentration and students' performance in upper-secondary schools in the Northern and Central part of the country, where the large majority of immigrants is concentrated. Special attention will be addressed to tracking and other school and compositional inequalities. Native families are often concerned with the concentration of non-natives in certain schools, and they may try to avoid stigmatized schools, which in turn, may lead to compositional and school inequalities. While in primary and lower-secondary education the proportion of second generation immigrants prevails on newcomers, the opposite is true in upper-secondary schools (MIUR 2014).

Therefore, at this level of education there is an urgency to gain a better understanding of the effect of the school's ethnic concentration on students' performance. Second, in this chapter we allow the school's ethnic concentration effect to be non-linear, and tests to what extent the results are driven by schools at the extremes of the ethnic concentration distribution. The non-linearity will be accounted using a piecewise regression technique. Third, we look at whether the effect differs between native and non-native students. Students form different networks with different parts of their peers. It is, therefore, likely that the effect varies among these subgroups.

The Peer-Effect Literature

The Coleman report (1966) is among the first studies to show that students' achievement and attainment are strongly related to compositional characteristics of peers in the same school/classroom. The report has a special reference to schools' socioeconomic status and ethnic segregation. Schools with higher concentration of African Americans were shown to affect negatively the performance of both white Americans and African Americans; however, most of this gap is explained by other compositional effects (such as the school's socioeconomic composition). Subsequently, many scholars have confirmed Coleman's findings. The negative correlation between the school's ethnic concentration and its students' performance is a well-documented result in the American and European literature (Hanushek et al. 2009, Portes and Hao 2004, Cebolla-Boado 2007, Fekjær and Birkelund 2007; Cebolla-Boado and Medina 2010, Brunello and Rocco 2013); however,

when it comes to the nature and magnitude of the relationship, conclusions are less straightforward. Reasons are both conceptual and methodological.

Also, the gap between natives and non-natives, in terms of educational outcomes, has been extensively investigated by scholars (Schnepf 2004, Marks 2006, Rothon 2007, Fekjaer 2007, Dronkers et al. 2011, Azzolini et al. 2012, for a review on second generation immigrants see Heath et al. 2008). These findings are often consistent across countries and hold also net of several individual and contextual characteristics. If students with an immigrant background tend to underperform natives, this may come also with consequences for peer effect.

While the empirical regularity is well established in the literature, things are less clear once it comes to the reasons and mechanisms of the negative effects of too high ethnic concentration. More attention has been dedicated to causality issue, but much less to the theoretical explanation of the possible effects.

The literature identifies three main groups of causes that may explain why the concentration of immigrant students into classrooms and schools influence students' performance negatively (Cebolla-Boado and Medina 2010): micro-interactions, school-level effects, and compositional effects. Scholars that refer to the former mechanisms (Evans et al. 1992, Kao and Tienda 1995, Fuligni 1997, Kao 2004) would state that the effect of concentration is determined to a large extent by peers interactions and relations. Once proper measurements are included in the model other contextual – school level and compositional - effects would decrease significantly. The argument seems to assume that immigrants are less inclined towards educational success. This would result in micro-interactions, which act as disincentives to other peers, in the same classroom or school. These types of explanations often lie along social capital theories (Portes and Zhou 1993). The question whether non-native students have lower educational aspirations compared to natives is still an open debate and results are conflicting. Some scholars found that immigrant students expect to attain a university degree more often than their native colleagues, net of socioeconomic status (Kao and Tienda 1998, Lauglo 2000, Cebolla-Boado and Medina 2010). Others, on the contrary, find an opposite result (Minello and Barban 2012). Large variability was shown to exist between different ethnicities and whether the research regards old or new immigration countries.

Advocates of the school-level effect, on the other hand, state that immigrant students tend to be overrepresented in schools that differ from the rest, substantially. Schools may differ, for instance, in terms of quality of teaching, student-teacher ratios, and economic and cultural resources (Arum 2000, Opdenakker and Van Damme 2001, Portes and Hao 2004, Roscigno et al. 2006). If students with an immigrant background

are segregated in disadvantaged schools, the average low performance in these schools cannot be related to the ethnic concentration, but it is related to other unequal sorting mechanisms. Once these institutional and school-level differences are taken into account, the gap between natives and non-natives in school performance and the negative effect of immigrants on students' performance would decrease respectably.

Similarly, explanations related to the compositional effects refer to socioeconomic and sociocultural composition of the peer group (Coleman 1966, Kao and Thompson 2003, Cebolla-Boado 2007, Cebolla-Boado and Medina 2010). If immigrant students are overrepresented in schools with other students from disadvantaged family backgrounds, the correlation cannot be seen as a causal relationship.

Assessing peer/social interaction effects (hereafter peer effects) is a difficult attempt. One of the main challenges in the peer effect literature is that schools and classrooms are not formed randomly. Manski (1993, 1995) highlights three different hypotheses why individuals belonging to the same context/group behave in similar ways: first, the prevalence of any behaviour in a group will affect others (*endogenous effects*); hence, achievement is affected by the achievement of other peers of the same reference group; second, the probability that an individual behaves in a certain way depends on the distribution of exogenous background characteristics in the reference group (*contextual effects*); third, individuals behave similarly because they come from similar backgrounds that tend to cluster in similar contexts (*correlated effects*). Disentangling the former two effects is a difficult issue. The average characteristics of the peers could capture either exogenous (contextual) or endogenous effects. A correlated effect, on the other hand, arises when the group of peers is affected by a common influence; for instance, when non-native students are clustered in specific classes (remedial classrooms), schools, or type of schools that have fewer resources or that have less competent teachers. If these correlated effects are linked to the peer group composition and they are not observed, the peer effect will be spurious (Manski 1993, Moffitt 2001). In short, peer effect is often affected by pre-existing sorting mechanisms that, if neglected, would give rise to biased estimations.

Scholars have dealt with this issue in different ways, either by assuming that students are unevenly assigned to schools, but they are randomly assigned to classes (Ammermueller and Pischke 2009, Contini 2013, Ballatore et al. 2013), by accounting for neighbourhood effects (Cebolla-Boado 2007), or by aggregating peer effect measurements at the country level (Brunello and Rocco 2013). Schneeweis and Winter-Ebmer (2007) investigate peer effects in upper-secondary education accounting for the school-type fixed effect, thus controlling for school types. Most studies on peer

effect, however, rely on several assumptions on the distribution of individuals across social spaces. This could partially explain why in the literature there is still no agreement on whether the proportion of non-natives in the classroom or school harms students' performance.

Secondary education in Italy and hypotheses

The Italian educational system is comprehensive, from primary to lower secondary education, until 14 years of age. Afterwards, students choose among three main options: a five-year academic oriented education (*licei*) offered by general schools; a five-year technical education (*istituti tecnici*); and a three to five-year vocational education (*istituti professionali* or *formazione professionale*). These options clearly differ in terms of purposes, subjects, academic standards and prestige, with the academic trajectory being the most prestigious and demanding track, later followed by technical and vocational schools. The literature has widely documented how school choice is socially stratified, thus, not entirely based on meritocratic criteria (Panichella and Triventi 2014). If ascribed characteristics, such as parental background and immigration status, influence the distribution of students across school types (beyond students' ability), this would affect the educational opportunities of different social groups, as well as school segregation processes, which will further increase the inequality in educational opportunity. Even if all three branches of education (potentially) give access to higher education, the proportion of students with a vocational qualification making the transition to higher education is extremely low (Barone 2012, Azzolini and Barone 2013).

Compared to other European countries, the Netherlands and Germany for instance, parents and students in Italy are free to choose the type of the school. This aspect, according to Checchi and Flabbi (2007), increases the importance of parental background for school choice. Basically, children from socioeconomically less advantaged families are much more likely to enrol in vocational oriented tracks than their peers from higher status families. Similarly, Azzolini and Barone (2013) demonstrate how students from an immigrant background have greater risks to opt for the vocational track, rather than for the academic track compared to natives.

Besides uneven sorting processes between tracks, school choice could also be dependent upon other characteristics of the school, such as the proportion of immigrants within the school. There is a growing literature that analyses whether the concentration of immigrant minorities within schools is associated with "white flight" processes

(Lankford and Wyckoff 1992, Rangvid 2009). In other words, parents are more likely to opt out schools that have certain unwanted and stigmatised characteristics, such as a too large concentration of non-native students. This would contribute to the creation of polarised schools, isolating the most disadvantaged children in the worst schools.

Ethnic concentration effect across school types

Since the choice of school is not random, this stratified process may affect the extent to which the school's ethnic concentration affects students across different types of school. Between tracks, differences will then depend on the selectivity of migrants into school types, as well as on the average students' performance. School performance, parental background, and teachers' recommendations are important determinants of school choice (Checchi and Flabbi 2007, Panichella and Triventi 2014); however, their impact was shown to vary between natives and non-native students (Barban and White 2011, Bonizzoni et al. 2016).

On the one hand, immigrant students that opt for the general track are a selected group and this is even truer for non-natives, since the social class of origin plays a minor role among them. The selection into tracks should be to a large extent dependent on school performance, as suggested by previous studies (Barban and White 2011). Furthermore, they may be a more integrated group, compared to peers that 'opted' for a vocationally specific pathway, in terms of language proficiency and cultural norms. If only the "very best" immigrant students enrol into general schools, then one should expect a lower ethnic concentration effect on students' school performance in this branch of education, compared to the vocational track (*Hypothesis 1a*).

On the other hand, native students are, on average, positively selected into general schools, in terms of school performance, educational aspiration and motivation, and behavioural attitudes (Barban and White 2011). If in academic oriented schools, the average performance of students is high, then there might be more room for the ethnic concentration to exert its negative effect, leading to a stronger negative effect in general, compared to vocational schools (*Hypothesis 1b*).

The school-type is an important indicator of pre-existing sorting processes; however, cross-school variability may still be large within tracks. While most neighbourhoods provide primary and lower-secondary education, upper-secondary schools are more likely to be concentrated in the urban area. The effect of pre-existing sorting process, such as neighbourhoods, should then be lower in upper-secondary, as compared to primary and lower-secondary education. This may also reduce the risk of white flight processes since school options are mainly between different tracks. In medium and medium-large

cities, however, students can often choose among more than one alternative. If schools differ in terms of quality and resources, tracking is insufficient to account for selectivity. The quality of a school depends, among other things, on its teachers and on economic and instructional resources. In Italy, teachers can move from one school to another in two ways: either because they request to be transferred to another school (only tenured teachers), or because they are not yet members and thus, they are required to move from one school to another according to current vacancies. Good teachers and teachers with experience, therefore, may prefer to teach in more prestigious, well-off and less problematic schools and this would affect students with poor socioeconomic resources negatively. Empirical models include controls to account for cross-school differences in resources, quality of teaching, and the socioeconomic composition of the peer group.

Furthermore, if parents can choose between more alternatives, they may employ other criteria, exacerbating within track compositional processes that are not grasped by school tracks.

Ethnic concentration effect on native and non-native students

The school's ethnic concentration may also exert a different negative effect on school's performance between native and non-native students. The literature has repeatedly found a preference for intra-ethnic over inter-ethnic friendships (i.e. Wade and Okesola 2002). The preference for intra-ethnic friends is related to similarities within an ethnic group, such as sharing the language and having similar cultural and economic backgrounds (Maharaj and Connelly 1994). Social similarity facilitates communication and sense of belonging and reduces uncertainty (Reskin et al. 1999); however, the effect on school performance may depend on the other peers belonging to the same network and on their attitudes towards education. This may also have implications in terms of peer effect.

Studies on intra and inter-ethnic friendship and its effect of school performance, however, often refer to the North American context, which has peculiarities that cannot be extended to new immigration countries such as Italy. As a result, this line of reasoning may not be entirely applicable to the Italian context, as the still low proportion of immigrant students in upper-secondary schools comes from a variety of countries of origin. Nevertheless, homogeneity may still be greater among minorities, compared to the majority. Irrespective of the country of origin, immigrant students face similar social conditions, such as language and cultural barriers, integration problems, economic precariousness, that may bring them together to an easier extent, compared to the majority. In a peer effect perspective, if immigrant students are more likely to stick together and they have language and learning problems to a larger extent than natives,

they may mutually reinforce low performance. Tracking, however, may work as a 'quality' selector, as previously discussed. The effect of concentration, therefore, may affect natives and non-natives differently, in favour of natives, in vocational schools, while no differences are expected in general and technical schools (*Hypothesis 3*).

The non-linearity of peer effect

Most studies have modelled the school's ethnic concentration as a linear effect (Cebolla-Boado 2007, Fekjær and Birkelund 2007, Lee 2007, Contini 2013); however, it may be reasonable to believe that if there is an effect of concentration, this effect is non-linear. This issue is also important in order to access the usefulness of the arbitrary 30percent cut-off point established by the Italian government, as a maximum proportion of non-natives in classrooms.

The non-linearity of peer effects was raised by Crane (1991). Other scholars have addressed this issue in regard to the ethnic concentration effect (Brännström 2008, Cebolla-Boado and Medina 2011, Szulkin and Jonsson 2007). In Spain, for instance, the effect is closed to zero until a ratio of 10 percent, negative, but still not significant, with a share ranging between 10 and 20 percent, and significantly negative with a proportion higher than 20 percent (Cebolla-Boado and Medina 2011). However, as suggested by the authors, only few schools in Spain have a ratio of immigrants greater than 20 percent. A similar argument was raised by Szulkin and Jonsson (2007) with regard to Sweden. They find a negative ethnic concentration effect only in schools with a proportion of immigrants greater than 40 percent; however, only few schools are beyond this threshold.

By neglecting the non-linearity of a peer effect variable, one could draw misleading conclusions. For instance, one could conclude that, *ceteris paribus*, the higher the ratio of immigrants - the lower the average performance of natives. However, the negative effect could be driven by schools at the extremes of the ethnic concentration distribution and not by a real linear effect. The 30 percent cap established by the Italian government raises the question whether this threshold is also supported empirically. This chapter tests whether the effect is non-linear and, more precisely, whether it is driven by schools at the extremes of the ethnic distribution, by schools with a relatively large proportion of non-natives.

Research design

Data and Methods

Data derived from the 2009 and 2012 OECD Programs for International Study Assessment (PISA) was used. It is a survey that takes place every three years and assesses the performance in mathematics, reading, and science literacy of 15-year-old students. PISA uses a two-stage stratified sample design: in the first stage, the units are schools serving 15-year-old students that were randomly sampled from a comprehensive national list of all eligible schools. The second-stage sampling units are students within schools. Once schools were selected, a complete list of all 15-year-old students was collected, from which a sample of 35 students was randomly selected.

Students' performance is reported as *plausible values*, created by regressing the student ability, thus the result obtained, with several characteristics of the student background. This is a measure mostly used in large scale assessment surveys, such as PISA, as it is believed to achieve more reliable estimates of students' competences. A correct procedure requires running the analysis for each plausible value and then computing the average of the test score and the other regressors. The standard error is not computed by calculating the average, but a more complex formula is used, where the coefficient for each plausible value is compared with the final estimation (average of the parameters for each plausible value) and the difference is squared (for more details see: *PISA 2009 Technical Report*). The value of each test is standardized across countries, with a mean score of 500 and with a standard deviation of 100.

The assumptions of Ordinary Least Square (OLS) regression are unlikely to be met when a cluster sampling method is used, such as in PISA survey. In other words, one would expect the achievement of pupils within a school to be more similar than in the case of a random sample of students, since pupils within the same school share a common environment (curriculum, teachers, resources, *etc.*) that may influence their average performance. Hence, when one expects variation across groups, Hierarchical Lineal Models are better in achieving more accurate estimations. Models will be fitted using the student-level and school-level probability weights, adjusted according to the approach suggested by Pfeffermann et al. (1998). Since the effect of the proportion of immigrants on students' performance is expected to be non-linear, and more precisely, to be driven by schools at the extremes of the ethnic concentration distribution, a piecewise regression technique was adopted (or segmented linear regression). The piecewise technique has the advantage to analyse career progression without requiring a predefined functional form. When analysing the relationship between two variables

(*x* and *y*) it may be that for different ranges of *x,* different linear relationships occur. Hence, both the single linear model and the non-linear model (quadratic) may not be appropriate. Piecewise regression is a form of regression that allows multiple linear models to be fitted for different ranges of *x*.

Dependent and independent variables

Pisa survey provides students' performance in mathematics, reading, and science. We focus on the former two competences to have a broader understanding on whether the school's ethnic concentration exerts a negative effect on different types of competences, namely numeracy and literacy. The school's proportion of immigrants was derived by aggregating individual-level information on whether the student is Italian or he/she has an immigrant background. It might be intuitive to believe that the peer pressure operates at the class level (Hoxby 2000, Cebolla-Boado and Medina 2010) rather than at the school level, since students spend most of the school time in the classroom. Unfortunately, PISA does not provide information on the classroom-level; however, since only 15-year-old students are interviewed, by aggregating individual information, we do not measure peer pressure at the school level either, but peer effect among peers that are most likely attending the same grade. The small number of second generation immigrants in upper-secondary schools, did not allow us to distinguish between the proportion of first and second generation immigrants. However, a control indicating the school's proportion of second generation immigrants is included in the model. Furthermore, there was no information on the country of origin of students with an immigrant background. The variable, therefore, includes both non-natives from Western, as well as from non-Western countries.

Pisa technical report (OECD 2012) suggests to exclude schools with a response rate below 50 percent, in order to reduce the risk of selection on respondents. To achieve a measure as close as possible to the true composition of the school, without losing too many cases, on the other hand, the minimum response rate to 70 percent was set, thus only schools with at least 25 students. Throughout this selection, 6,178 out of 61,299 cases were deleted. However, the rather small number of students randomly selected within schools may underestimate the true proportion of non-native students, especially in schools with a relative small concentration of immigrants.

In line with previous papers (i.e. Contini 2013), Southern regions were excluded from the analysis. The reason is that immigration is not yet a relevant phenomenon in the South of Italy. Furthermore, these two parts of the country are structurally different in many aspects (Bratti et al. 2007). Since students in Southern regions, on average,

underperform students in the rest of the country, and the share of schools without non-native students is much larger in the South than in the Centre and North, the effect of school segregation would be affected by other structural difference, such as average students' performance. Results would be, therefore, misleading. In short, results in this chapter can only be generalized to the North and the Centre of Italy. In the next paragraph, some descriptive statistics show the distribution of immigrant students across the areas of residence. Without controlling for the school type, the effect will be biased upward, since immigrant students tend to be concentrated in vocational tracks, where the average performance is much lower compared to technical and general schools.

In order to account for selectivity and possible mediating effects, controls at the individual and contextual level are included. At the individual level, gender and the student's economic, social, and cultural status (ESCS) are included in the models. The latter includes: the highest occupational status of parents, the highest educational level of parents measured through the ISCED classification; and the presence of cultural, educational, and material resources in the student's home. The index was derived from a principal component analysis of standardized variables (for more details see: *PISA 2009 Technical Report)*. Contextual variables are important; however, most of the variability in students' performance is still dependent on individual level characteristics (Azzolini et al. 2012). At the school level, six controls were used: the school's socio-economic composition, the proportion of fully qualified teachers (ISCED 5), whether the school lacks of teachers (teacher shortage)[1], and the school's educational resources[2] (more details on the operationalization of these indexes are reported in the note section). Two additional controls indicate the location of the school and whether there are other schools nearby that may compete for the same student-body. These controls should partially account for selectivity problems that go beyond the school type. PISA questionnaire provides the information on whether the school is located in a small town (from 3 to 15 thousands inhabitants), in a town (from 15 to 100 thousands inhabitants), in a city (from 100 thousands to one million inhabitants) or in a large city (more than one million inhabitants). The former two and the latter two were combined, distinguishing between medium-small and medium-large urban areas. This distinction should, to some extent, account for the probability that the distribution of schools is neighbourhood-based. The probability should be higher in medium-large cities, compared to medium-small towns. If more schools compete for the same student-body, the distribution of students among them could be unequal and dependent on other compositional characteristics.

Analyses

Distribution of non-native students across macro areas and school types

The presence of students with immigrant background in Italy is, on average, not only a new one but also a rather limited phenomenon: in the years 2009 and 2012 only 5 and 5.6 percent of students respectively come from migrant families as shown in Table 5.1. However, the distribution of immigrants across macro areas of residence and school types is very unequal. As emerges from Figure 5.1, regional differences in ethnic concentration are particularly pronounced between Northern and central regions, on the one hand, and Southern regions, on the other. The average gap is about five percentage points. Further, immigrant students are concentrated in vocationally oriented schools, where the average share reaches 8.1 percent in 2009, and 10 percent in 2012, but it reaches up to 14.1 percent in central regions. Table 5.1 displays this uneven distribution of students with an immigrant background by showing the proportion of immigrants across tracks within each macro area. The immigrant share in general schools in Central and Northern regions is 4.6 percent; while, in Southern regions the share drops to 1.4 percent. In technical and vocational schools, regional differences are even more pronounced: in the North and the Centre of Italy, the average proportion of non-natives in technical and vocational schools is 7.4 and 9.1 percent, and 10.9 and 14.1 percent, respectively, but reaches only 2.4 and 3.3 percent in the South. This, once more, underlines how immigration in upper secondary schools is not yet a relevant phenomenon for the Southern part of the country.

The last columns in Table 5.1 take a different look and report the distribution of students in schools with different proportion of non-natives. While in the North and the Centre of Italy, less than 20 percent of students attend schools without immigrants, in the South the proportion increases to almost 60 percent. At the same time, almost no students in the South are attending schools with an immigrant concentration greater than 20 percent, but it reaches around 5.5 percent in the other two areas.

More than 40 percent of general schools are without immigrants and almost no general schools have a share greater than 20 percent. In vocationally oriented schools, on the other hand, less than one quarter of students is in schools without immigrants and more than 13 percent is in schools with a ratio higher than 20 percent.

In the following part, we first give a more descriptive look at the association between the ethnic concentration and students' performance and then, we present the results for the ethnic concentration effect taking into account school and compositional inequalities.

Table 5.1: Students' ethnic origin and schools' proportion of non-natives by macro areas and school types. Wave 2009 and 2012

	Non-Natives (2009)	Non-Natives (2012)	|School's % non-natives (categories) (2009 and 2012)				
			0	0-5	5-10	10-20	20+
Macro areas (%)							
- North	6.5	7.5	19.8	25.3	32.4	17.2	5.3
- Center	6.6	7.5	16.0	24.3	33.8	20.9	5.4
- South	1.5	2.4	58.6	27.6	11.7	2.0	0.1
Average	5.0	5.6	33.0	25.9	25.2	12.4	3.5
School Types (%)							
- General	2.9	3.8	40.2	30.6	23.3	5.8	0.1
- Technical	5.0	6.8	28.0	23.7	28.3	17.2	2.7
- Vocational	8.1	10.0	22.7	17.5	25.2	21.7	13.6

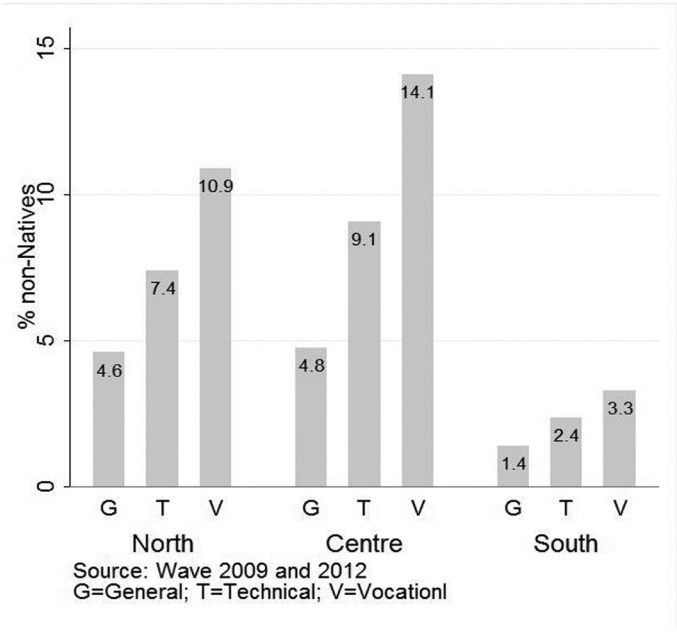
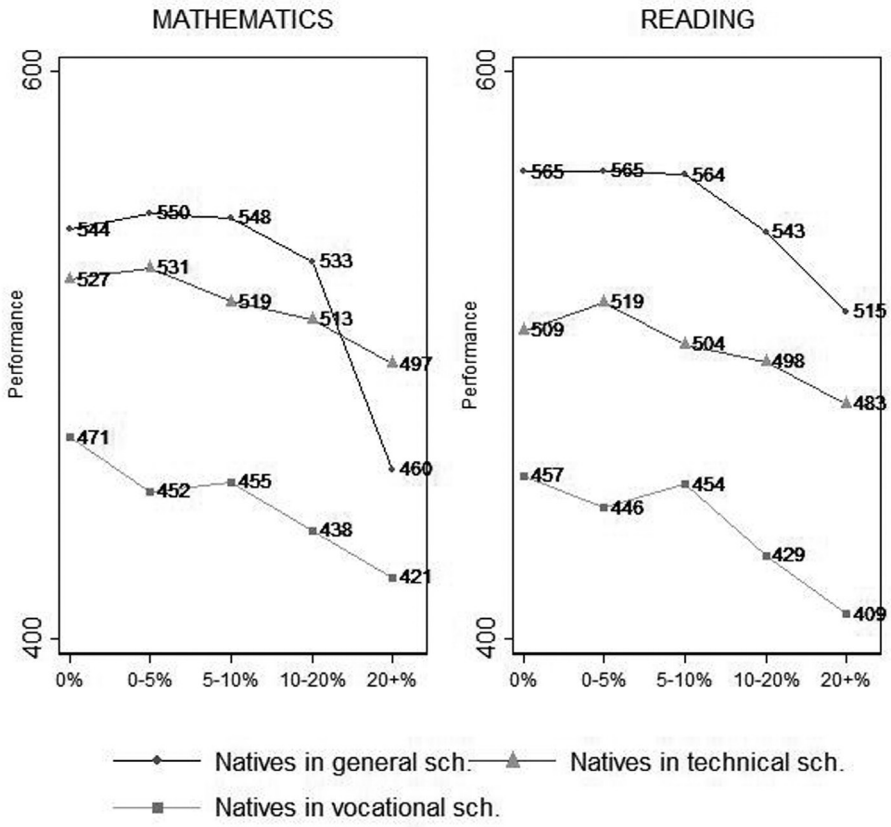


Figure 5.1: Percentage of non-natives across tracks and over macro area

Ethnic Peer Pressure or School Inequalities? A Descriptive Overview

Figures 5.2 and 5.3 show the average performance in mathematics and reading of native and non-native students in schools with different shares of immigrant students. In general schools with a share of immigrants ranging between 10 and 20 percent, the average performance in mathematics and reading of natives is, respectively, 2 percent and 4 percent smaller than in schools without immigrants. In vocational and technical schools the same disadvantage in mathematics is 2.6 and 7 percent and in reading 2.1 and 6 percent, respectively. If schools with more than 20 percent immigrants are considered, the gap in mathematics and reading increases by 5.7 and 5.1 percent in technical schools and by 10.6 and 10.1 percent in vocational schools. With regard to non-natives the pattern is slightly different: the average performance in mathematics in schools with a proportion of immigrants between 10 and 20 percent compared to schools with a share between 0 and 5 percent decreases by 2.3, 3.7, and 3.6 percent in general, technical and vocational schools, respectively. With regard to reading the performance decreases by 4.5, 1.5, and 4.6 percent in general, technical, and vocational schools respectively. With regard to schools with a proportion greater than 20 percent, the gap in mathematics increases by 6.1 percent in technical schools and by 6.9 percent in vocational schools: while the gap in reading increases by 3 and 11 percent in technical and vocational schools respectively.

Several conclusions can be drawn from this preliminary and descriptive attempt to investigate the association between the school's ethnic concentration and students' performance. First, with regard to natives, there is a cross-tracking variability in the disadvantage of having non-native peers in school. The disadvantage is almost double in vocational, compared to general and technical schools. The cross-tracking variability is weaker among non-natives, especially between technical and vocational schools. Second, between one third and half of the gap, depending on the type of school and on whether natives or non-natives are concerned, is driven by schools with more than 20 percent immigrants. In sum, the association seems not to be linear, but, conversely, it seems to intensify beyond a share of 20 percent. Furthermore, the disadvantage seems to be greater in vocational schools than in general and technical ones.



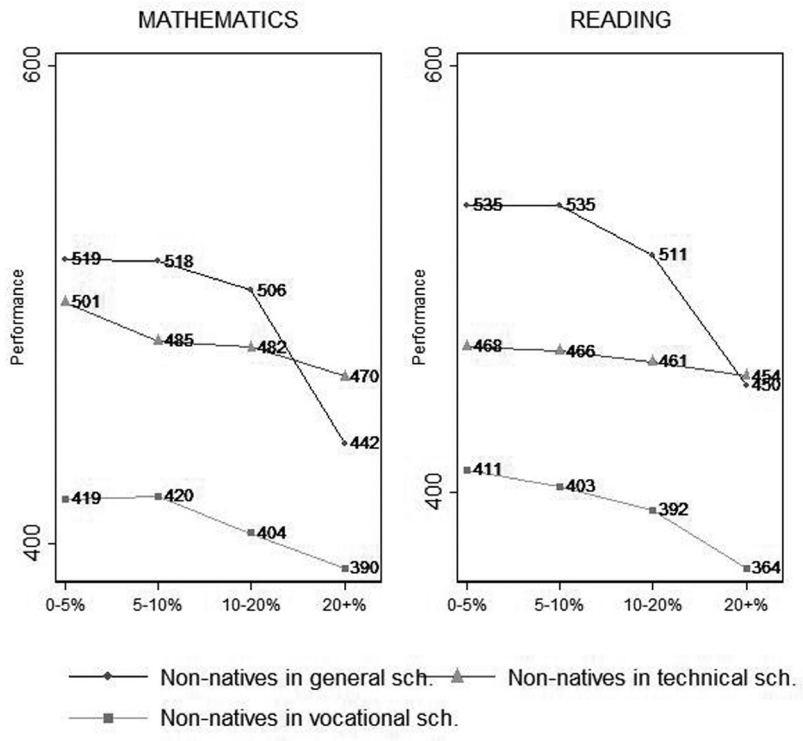
Source: PISA 2009 and 2012. The 1st PV was adopted.

Figure 5.2: Mean natives' performance in mathematics and reading in schools with different proportion of students with an immigrant background. Results shown for the three types of school

As it was problematized above, the effect of concentration could be mediated by other sorting processes. Schools may offer different qualities of learning environments, either because they differ in the amount of educational resources available, or because more qualified teachers tend to prefer schools with high-achieving students. It can also be because non-native students tend to concentrate in schools where the ratio of students from a disadvantage background is high (Opdenakker and Van Damme 2001, Cebolla-Boado and Medina 2011). The left-hand box in Figure 5.4 shows the correlation between the ratio of qualified teachers (with an ISCED 5 qualification) and the school's proportion of immigrant students. While in general and technical schools the correlation seems to be irrelevant (note that the increase in general schools from 18 to 35 percent immigrants

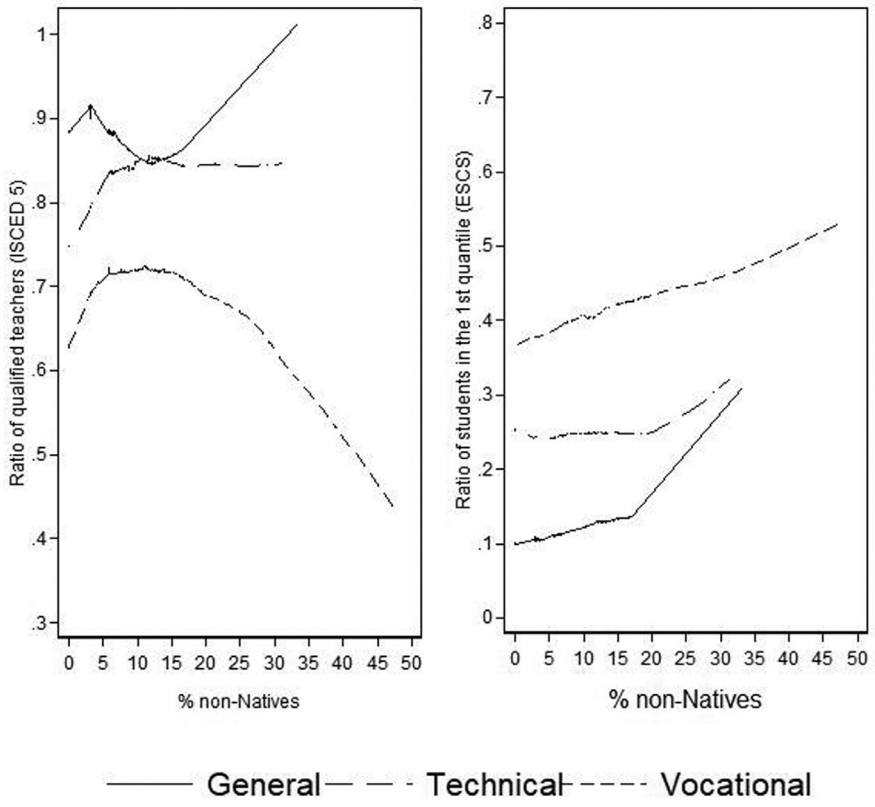
is driven by one school); in vocational schools, beyond a share of 25 percent the ratio of qualified teachers decreases sharply. Non-natives in vocational schools seem to be doubly penalised: first, they tend to concentrate in vocational schools, where there is strong evidence of the low-level and low-quality average performance of students; second, teachers' quality decreases where they are better concentrated.

As shown in the right-hand box of Figure 5.4, in vocational schools there seem to be a socio-economic and socio-cultural composition effect. The correlation between the school's proportion of immigrants and the school's ratio of students in the lowest quantile of the socio-economic and socio-cultural distribution is positive. The gap between vocational schools without immigrants and vocational schools with a share around 50 percent is close to 15 percentage points. Also, in technical schools with a proportion of immigrants greater than 20 percent, the proportion of students in the lowest quantile of the socio-economic and socio-cultural distribution increases.



Source: PISA 2009 and 2012. The 1st PV was adopted.

Figure 5.3: Mean non-natives' performance in mathematics and reading in schools with different proportion of students with an immigrant background. Results shown for the three types of school



Source: PISA 2009 and 2012.

Figure 5.4: School proportion of qualified teachers (ISCED 5) and school concentration of students with a low ESCS at increasing proportion of immigrants. Non-parametric estimates.

Ethnic Concentration Effect on Natives and non-Natives

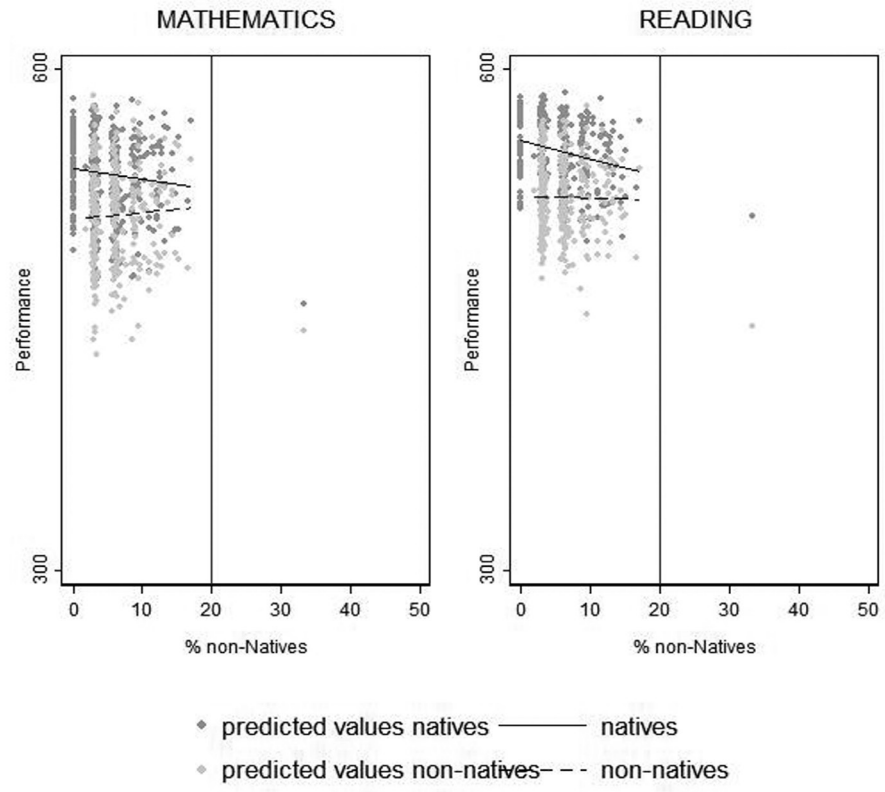
In the previous section, the average performance in mathematics of natives and non-natives in schools with different proportions of immigrants was shown. It is still unclear, however, whether the association between the school's ethnic composition and the students' performance is significant, and whether this association holds also after accounting for other uneven sorting processes. Italy is a relatively new immigration country; therefore, there are still few schools with a proportion of immigrant students greater than 20 percent, and they tend to be concentrated in the vocational branch. For the sake of simplicity, only results for the complete models will be displayed.

Figures 5.5, 5.6, and 5.7 report results for both mathematics and reding performance in general, technical and vocational schools, respectively (coefficients shown in Table 5.3 in the appendix). The non-linearity of the association between the school's ethnic density and natives and non-natives performance seems to be supported, with the exception of non-natives in vocational schools. The effect is not significant and the slope is rather flat for both natives and non-natives in schools with a proportion of immigrants below 20 percent. This is an important finding as the majority of upper secondary schools in Italy have fewer than 20 percent immigrants. If the school's ethnic composition is modelled as a linear effect, we would find a significant association between the proportion of immigrants in school and the average students' performance. This result, however, would be misleading, as the significance is driven by few schools at the extremes of the ethnic concentration distribution. This argument is even truer for general and technical schools, where only few schools have a proportion of non-natives greater than 20 percent. In general and technical schools, the slope below and above the threshold increases substantially. These results, however, are meaningless with regard to general schools, as only one school exceeds 20 percent immigrants, as shown in Figure 5.6. Little can be said with regard to technical schools as well, as only 13 schools have a share greater than 20 percent (Figure 5.7).

We reasoned that the effect of concentration should vary across types of schools. Two competing hypotheses were formulated: one predicts a stronger negative effect in vocational compared to general schools, due to the selection process allocating students into the three types of schools. The other, conversely, predicts a stronger negative effect in general schools, due to the higher average performance of students in this branch of education. Net of individual and school-level characteristics, we do not observe large differences between tracks. Among natives, there seems to be no substantial differences between tracks, especially with a share of immigrants below the threshold. Contrary to expectations, in vocational schools the change in the slope is less steep compared to technical schools. This result could partially be explained by the larger sample of vocational schools, with a share of immigrants greater than 20 percent.

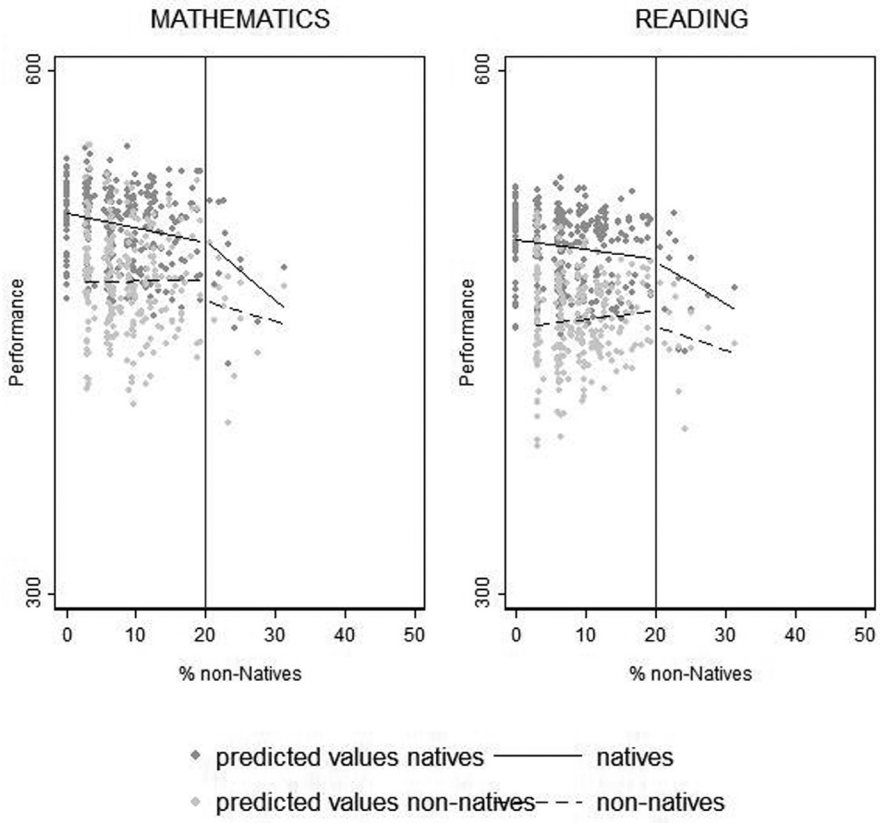
The last hypothesis expects non-natives in general and technical schools to be influenced by the proportion of immigrant peers in a similar way than Italians; while, in vocational schools the association is expected to differ, compared to natives. Both hypotheses seem to be supported. Similarly to Italians, non-native students are not affected by peers in general and technical oriented schools, until a ratio of 20 percent, as shown in Figures 5.5 and 5.6. Beyond this ratio, the effect is significant. However, we should pay the same caution as for natives with schools with a share greater than

20 percent. In vocational schools, conversely, the effect differs to natives. The effect of concentration on immigrant students in vocational schools is linearly negative. The correlation turned out to be significant both below and above the threshold.



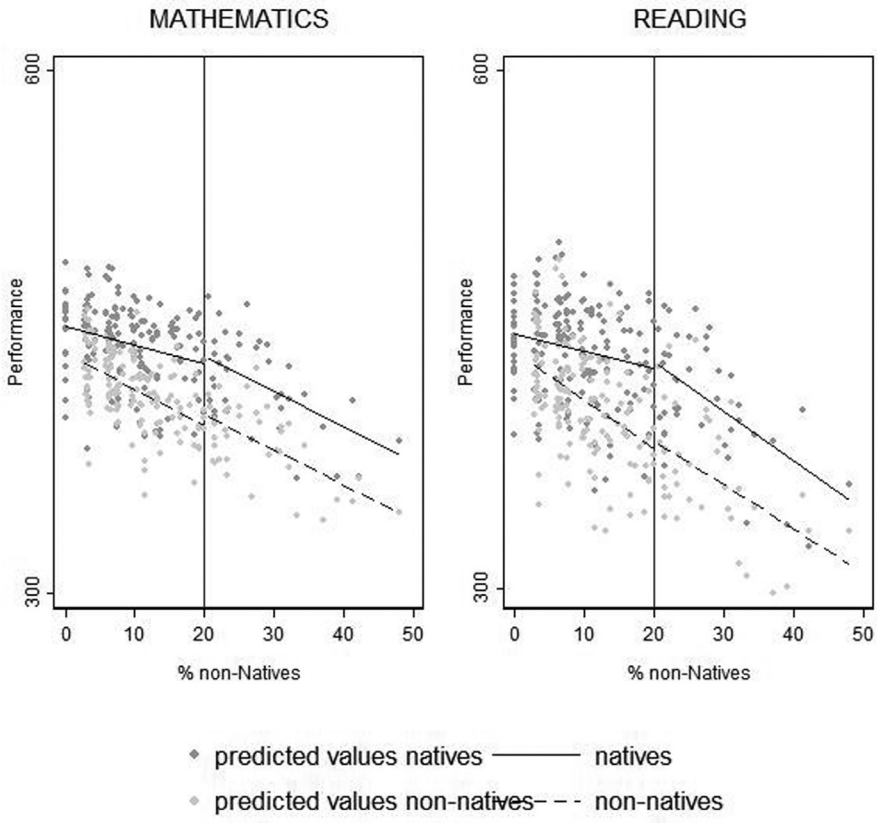
Source: PISA 2009 and 2012. The 1st PV was adopted.

Figure 5.5: Natives and non-natives mathematics and reading score at increasing proportion of students with an immigrant background. Slope estimated before and after the 20 % cut-off (only general schools).



Source: PISA 2009 and 2012. The 1st PV was adopted.

Figure 5.6: Natives and non-natives mathematics and reading score at increasing proportion of students with an immigrant background. Slope estimated before and after the 20 % cut-off (only technical schools).



Source: PISA 2009 and 2012. The 1st PV was adopted.

Figure 5.7: Natives and non-natives mathematics and reading score at increasing proportion of students with an immigrant background. Slope estimated before and after the 20 % cut-off (only vocational schools).

Conclusion and discussion

The rapid growth of immigrant flow to Italy and consequently to its educational system, has enhanced the public concern over the assimilability of newcomers and the possible negative effects on the natives. However, this concern, as the research showed, seems not to be entirely founded.

This study suggests that the ethnic concentration effect on natives' achievement in the North and the Center of Italy is non-linear, and negative effects might occur only once a rather high and empirically still rare concentration of immigrants is reached. The misspecification as linear effects will lead to wrong conclusions and consequently to wrong policy implications. Once school and compositional controls are included in the model, the effect of immigrants' concentration on natives is only significant in schools with a ratio of immigrants greater than 20 percent. This regards about five percent of students in upper-secondary education, as emerged from Table 5.1, thus a very minor part of the student-body. In short, the findings suggest, in line with Crane's arguments (1991), the importance to determine thresholds in peer effect analyses and it provides empirical evidence for the relevance of the political decision to limit the concentration of immigrants in classes to 30 percent.

Further, the effect of concentration depends on the school type. Immigration seems to affect natives and non-natives similarly in general and technical schools. Both are not influenced by peers with proportions smaller than 20 percent. In vocational schools, on the other hand, the proportion of immigrants is linearly associated with non-natives' performance; while, it affects natives only beyond the threshold of 20 percent. The public concern should then focus on vocational schools, where social problems and exclusion tend to concentrate. Whereas, in general and technical schools the selected group of immigrants should not be a concern for Italian students yet.

One of the major methodological challenges analysing peer effects lies in the non-random distribution of students across social spaces. The major part of this selection process in Italian's upper secondary education, however, is reasonably captured by school types. Therefore, conducting the analysis separately for the three school types allowed, to some extent, to control for this selectivity issue – although the reported associations should not be interpreted as strictly casual, as endogeneity cannot be fully ruled out, due to unobserved characteristics.

This study, due to data limitation, does not distinguish between different ethnic groups. The latter differ in terms of social exclusion, disciplinary problem, educational expectations, and language and cultural barriers. A development could be to disentangle

the effect of concentration into smaller groups and to see whether the effect varies across ethnicities.

Notes

1. The index was derived from four items measuring school principals' perceptions of potential factors hindering instruction at their school. These factors are a lack of: *i)* qualified science teachers; *ii)* a lack of qualified mathematics teachers; *iii)* qualified Italian teachers; and *iv)* qualified teachers of other subjects (for details see: PISA *2009 technical report*).
2. The index was derived from seven items, measuring school principals' perceptions of potential factors hindering instruction at their school. These factors are: *i)* shortage or inadequacy of science laboratory equipment; *ii)* shortage or inadequacy of instructional materials; *iii)* shortage or inadequacy of computers for instruction; *iv)* lack or inadequacy of Internet connectivity; *v)* shortage or inadequacy of computer software for instruction; *vi)* shortage or inadequacy of library materials; and *vii)* shortage or inadequacy of audio-visual resources (for details see: PISA *2009 technical report*).

Appendix

Table 5.2: Descriptive statistics

	North and Center (N:28.700)	
Variables	Mean	SD
Mathematics (5 plausible values)		
- Math PV1	514.6	85.8
- Math PV2	514.6	86.3
- Math PV3	514.6	85.8
- Math PV4	514.8	85.6
- Math PV5	514.7	86.0
Reading		
- Reading PV1	514.9	88.2
- Reading PV2	515.1	88.7
- Reading PV3	514.5	88.3
- Reading PV4	514.7	88.4
- Reading PV5	514.7	88.5
-		
Individual level variables		
Gender		
- Male	51.0	
- Female	49.0	
Wave		
- 2009	50.5	
- 2012	49.5	
ESCS index (min/max: 0-100)	61.2	11.9
Macro area of residence		
- North	69.2	
- Center	30.8	
School type		
- General	46.5	
- Technical	33.1	
- Vocational	20.4	
School level variables		
School's proportion non-natives (min/max: 0-48)	7.2	6.8
School's proportion 2nd gen immigrants (min/max:0-28)	2.0	2.8
School's proportion low ESCS (min/max: 0-100)	46.6	15.9
School's community		
- More than 100 thousands (city)	26.5	
- Less than 100 thousands (town)	73.5	
School's competition		
- Only one school	30.8	
- More than one school	70.2	
% qualified teachers (min/max: 0-100)	82.0	25.0
Teachers shortage (min/max: 0-100)	29.3	17.9
School's educational resources (min/max: 0-100)	66.9	16.2

Table 5.3: Multilevel models of the school's ethnic composition effect on students' performance in mathematics by school types, immigration status, and competences

% non-natives	General		Technical		Vocational	
	Natives	Non-nat.	Natives	Non-nat.	Natives	Non-nat.
Mathematics						
Constant	478.2***	455.6 ***	459.8***	427.1***	383.4***	353.3***
% non-natives ≤ 20	-1.4	.17	-.45	.36	-.30	-1.8*
% non-natives > 20	-6.7***	-6.3**	-5.7**	-4.9*	-1.4*	-2.0*
Reading						
Constant	529.5***	511.1***	469.1***	322.5***	384.9***	335.4***
% non-natives ≤ 20	-1.4	-.10	-.23	.47	-0.0	-2.1*
% non-natives > 20	-4.1	-4.1	-4.1^	-2.2	-1.6^	-2.7**
N students	12,658	608	8,435	653	4,428	387
- ≤20	22	11	211	98	788	281
- >20						
N schools	408	316	288	238	160	137
- ≤20	1	1	13	13	39	39
- >20						

Source: PISA 2009 and 2012. ^p<.10; *p < .05; **p < .01; ***p < .001.
Models net of: school's proportion 2nd generation immigrants, gender, wave, macro area, student' ESCS, school's location, presence of competing schools, teachers' quality (ISCED 5), school's educational resources, teachers shortage, school's share of students with a low ESCS (full model). Models exclude Southern regions.

Acknowledgements

A few words of thanks are due to all those people that guided and supported me throughout the PhD and that made the writing of this thesis possible.

I'd like to thank my partner for her unconditional support throughout all these years and my child, Martino, for the strength and vitality he has transmitted me.

I'm deeply grateful to my supervisors for the thoroughness of their supervision, their extensive feedback on my work in progress and their guidance at any stage of the PhD period. Stefani, you have always been very generous in giving me accurate comments and in supporting me throughout these years. Each time I felt a bit lost, you were there helping me to overcome any obstacle. I remember when I took your exam for the first time (quantitative methods). It was a failure. Despite that, I came to your office telling you I wanted to go to Tilburg for the Double Degree. You were a bit sceptical, but you gave me a second chance. Hope you don't regret it!

Ruud, I enjoyed our collaboration during these years. You have been since the very beginning very informal and friendly. You have always guided my ideas without, however, telling me what to do. It wasn't always easy, but I've learnt to be more autonomous and confident when I have to take decisions. I remember the course you held at the Master. It was a nightmare for me, but it was the course that affected me the most. Now, any time I teach, I apply the same structure of that course.

Paul, I've to thank you for the careful look at the final version of my dissertation and for the accuracy of the comments you have provided which have certainly improved the final outcome.

I'm deeply grateful to another scholar I had the chance to meet and work with in the past few years. Steffen, thank you for your hospitality during my visiting at the BAGSS, but especially for the opportunity to write a paper together. I enjoyed our collaboration, our chatting, our hiking and wine tasting.

While writing this thesis, I benefited a lot from an intellectually stimulating environment. I'd like to thank all the current and former members of the PhD programme in Sociology and Social Research for the many exchanges we had during these years. I'd like to thank: Elisa, Raffaele, Mattia, Giampiero, Francesca, Filippo, Gabriele, Riccardo, Giorgio, Emma, Emanuele. And I am sure I am forgetting someone.

References

Allen, J., & De Grip, A. (2012). Does skill obsolescence increase the risk of employment loss?. *Applied Economics*, *44*(25), 3237-3245.

Allison, P. D. (2009). Fixed effects regression models (Vol. 160). SAGE publications.

Allison, P. D., & Christakis, N. A. (1994). Logit models for sets of ranked items. *Sociological methodology*, 199-228.

Allmendinger, J. (1989). Educational systems and labor market outcomes. *European sociological review*, *5*(3), 231-250.

Ammermueller, A., & Pischke, J.F. (2009). Peer effects in European primary schools: Evidence from the progress in international reading literacy study. *Journal of Labor Economics,* 27(3), 315-348.

Andersen, R., & Van de Werfhorst, H. G. (2010). Education and occupational status in 14 countries: the role of educational institutions and labour market coordination. *The British journal of sociology*, *61*(2), 336-355.

Anderson, K. M., & Hassel, A. (2013). Pathways of Change in CMEs: Training Regimes in Germany and the Netherlands. *The Political Economy of the Service Transition*, 171-194.

Arrow, K. J. (1973). Higher education as a filter. *Journal of public economics*, *2*(3), 193-216.

Arum, R. (2000). Schools and communities: Ecological and institutional dimensions. *Annual Review of Sociology*, *26*(1), 395-418.

Atzmüller, C., & Steiner, P. M. (2010). Experimental vignette studies in survey research. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, *6*(3), 128.

Auspurg, K., & Hinz, T. (2015). *Factorial Survey Experiments*. Thousand Oaks, CA: Sage.

Azzolini, D, & Barone. C. (2013). Do they progress or do they lag behind? Educational attainment of immigrants' children in Italy: The role played by generational status, country of origin and social class. *Research in Social Stratification and Mobility* 31: 82-96.

Azzolini, D., & Barone, C. (2012). Tra vecchie e nuove disuguaglianze: la partecipazione scolastica degli studenti immigrati nelle scuole secondarie superiori in Italia. *Rassegna italiana di sociologia*, *53*(4), 687-718.

Azzolini, D., Schnell, P. & Palmer, R.B.J. (2012). Educational Achievement Gaps between Immigrant and Native Students in Two "New" Immigration Countries Italy and Spain in Comparison. *The ANNALS of the American Academy of Political and Social Science,* 643(1), 46-77.

Baethge, M., & Wolter, A. (2015). The German skill formation model in transition: from dual system of VET to higher education?. *Journal for Labour Market Research*, *48*(2), 97-112.

Ballatore, R.M., Fort, M. & Ichino, A. (2018). The Tower of Babel in the classroom: immigrants and natives in Italian schools. *Journal of labour economics*. doi: 10.1086/697524

Barban, N., & White, M. J. (2011). Immigrants' children's transition to secondary school in Italy. *International Migration Review*, *45*(3), 702-726.

Barbieri, P., & Cutuli, G. (2015). Employment protection legislation, labour market dualism, and inequality in Europe. *European Sociological Review*, *32*(4), 501-516.

Barbieri, P., Cutuli, G., & Passaretta, G. (2016). Institutions and the school-to-work transition: disentangling the role of the macro-institutional context. *Socio-Economic Review, 16*(1), 161-183.

Barone, C. (2012). Contro L'espansione Dell'istruzione (E Per La Sua Ridistribuzione). Il Caso Della Riforma Universitaria Del 3+2. *Scuola Democratica*, 4, 54-75.

Barone, C., & Ortiz, L. (2011). Overeducation among European University Graduates: a comparative analysis of its incidence and the importance of higher education differentiation. *Higher Education*, 61(3), 325-337.

Barone, C., & Schizzerotto, A. (2011). Introduction: Career mobility, education, and intergenerational reproduction in five European societies. *European Societies*, *13*(3), 331-345.

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *The journal of political economy*, 9-49.

Becker, G. S. (1975). Human capital: a theoretical and empirical analysis. New York: Columbia.

Becker, G.S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education.* Chicago, IL: Chicago University Press.

Bernardi, F. (2003). Returns to educational performance at entry into the Italian labour market. *European sociological review*, *19*(1), 25-40.

Bernardi, F. (2014). Compensatory advantage as a mechanism of educational inequality: A regression discontinuity based on month of birth. *Sociology of Education*, *87*(2), 74-88.

Bernardi, F., & Ballarino, G. (Eds.). (2016). *Education, occupation and social origin: a comparative analysis of the transmission of socio-economic inequalities*. Edward Elgar Publishing.

Bills, D. B. (1988b). Educational credentials and hiring decisions: What employers look for in new employees. *Research in Social Stratification and Mobility* 7: 71-97.

Bills, D. B. (1990). Employers' use of job history data for making hiring decisions: A fuller specification of job assignment and status attainment. *The Sociological Quarterly*, *31*(1), 23-35.

Bills, D. B. (2003). Credentials, signals, and screens: Explaining the relationship between schooling and job assignment. *Review of educational research*, *73*(4), 441-449.

Blossfeld, H. P. (1987). Labor-market entry and the sexual segregation of careers in the Federal Republic of Germany. *American Journal of Sociology*, 89-118.

Blossfeld, H. P., Kilpi-Jakonen, E., de Vilhena, D. V., & Buchholz, S. (eds.). (2014). *Adult learning in modern societies: an international comparison from a life-course perspective*. Cheltenham: Edward Elgar Publishing.

Blossfeld, H. P., Klijzing, E., Mills, M., & Kurz, K. (Eds.). (2005). *Globalization, uncertainty and youth in society: The losers in a globalizing world*. London, Routledge.

Bol, T., & Van de Werfhorst, H. G. (2011). *Measuring Educational Diversity: External Differentiation, Vocational Orientation, and Standardization* (Vol. 1). AMCIS Working Paper 2011.

Bol, T., & Van de Werfhorst, H. G. (2013). The Measurement of Tracking, Vocational Orientation, and Standardization of Educational Systems: a Comparative Approach. *Gini Discussion Paper 81*.

Bonizzoni, P., Romito, M., & Cavallo, C. (2016). Teachers' guidance, family participation and track choice: the educational disadvantage of immigrant students in Italy. *British Journal of Sociology of Education*, *37*(5), 702-720.

Bönke, T, Corneo, G., Lüthen, H. (2011). *Lifetime earnings inequality in Germany*. DIW Discussion Paper 1160. DIW Berlin.

Bowles, S., & Gintis, H. (2002). Schooling in capitalist America revisited. *Sociology of education*, 75(1): 1-18.

Brännström, L. (2008). Making their mark: The effects of neighbourhood and upper secondary school on educational achievement. *European Sociological Review,* 24(4), 463-478.

Bratti, M, Checchi, D, & Filippin, A. (2007). Geographical differences in Italian students' mathematical competences: evidence from PISA 2003. *Giornale degli Economisti e Annali di Economia*: 299-333.

Breen R, & Luijkx R (2004) Social mobility in Europe between 1970 and 2000. In Breen, R. (Eds.), *Social Mobility in Europe*. Oxford: Oxford University Press: 37–75.

Breen R. (Eds.) (2004) *Social Mobility in Europe*. Oxford: Oxford University Press.

Breen, R. (2005). Explaining cross-national variation in youth unemployment market and institutional factors. *European sociological review*, *21*(2), 125-134.

Breen, R., & Goldthorpe, J. H. (1999). Class inequality and meritocracy: a critique of Saunders and an alternative analysis. *The British journal of sociology*, *50*(1), 1-27.

Breen, R., & Goldthorpe, J. H. (2001). Class, mobility and merit. The experience of two British birth cohorts. *European sociological review*, *17*(2), 81-101.

Breen, R., & Jonsson, J. O. (2005). Inequality of opportunity in comparative perspective: Recent research on educational attainment and social mobility. *Annu. Rev. Sociol.*, *31*, 223-243.

Breen, R., Goldthorpe, J. H. (1997). Explaining educational differentials: Towards a formal rational action theory. *Rationality and society*, *9*(3), 275-305.

Breen, R., Hannan, D.F., & O'Leary, R. (1995). Returns to education: taking account of employers' perceptions and use of educational credentials. *European Sociological Review* 11: 59-73.

Breen, R., Luijkx, R., Müller, W., & Pollak, R. (2009). Nonpersistent inequality in educational attainment: evidence from eight European countries. *American Journal of Sociology, 114*(5), 1475-1521.

Breen, R., Van de Werfhorst, H. G., Jæger, M. M. (2014). Deciding under doubt: a theory of risk aversion, time discounting preferences, and educational decision-making. *European Sociological Review*, *30*(2), 258-270.

Brunello, G, & Rocco, L. (2013). The effect of immigration on the school performance of natives: Cross country evidence using PISA test scores. *Economics of Education Review* 32: 234-246.

Brunello, G., & Checchi, D. (2007). Does school tracking affect equality of opportunity? New international evidence. *Economic policy*, *22*(52), 782-861.

Brunello, G., & Schlotter, M. (2010). The effect of non-cognitive skills and personality traits on labour market outcomes. *Analytical report for the European Commission prepared by the European Expert Network on Economics of Education*.

Bryan, M. L., & Jenkins, S. P. (2015). Multilevel modelling of country effects: a cautionary tale. *European Sociological Review*, *32*(1), 3-22.

Brzinsky-Fay, C., & Solga, H. (2016). Compressed, postponed, or disadvantaged? School-to-work-transition patterns and early occupational attainment in West Germany. *Research in Social Stratification and Mobility*, *46*, 21-36.

Büchel, F., Helberger, C. (1995). Bildungsnachfrage als Versicherungsstrategie. *Mitteilungen aus der Arbeitsmarkt-und Berufsforschung*, *28*(1), 32-42.

Buchmann, C., & Hannum, E. (2001). Education and stratification in developing countries: A review of theories and research. *Annual review of sociology*, *27*(1), 77-102.

Bukodi, E., & Goldthorpe, J. H. (2012). Decomposing 'social origins': The effects of parents' class, status, and education on the educational attainment of their children. *European Sociological Review*, *29*(5), 1024-1039.

Cebolla-Boado, H. (2007). Immigrant concentration in schools: Peer pressures in place?. *European Sociological Review*, *23*(3), 341-356.

Cebolla-Boado, H., & Medina, L.G. (2011). "The impact of immigrant concentration in Spanish schools: school, class, and composition effects". *European Sociological Review* 27.5: 606-623.

Checchi, D., & Flabbi, L. (2007). Intergenerational mobility and schooling decisions in Italy and Germany. *IZA Discussion Paper* No 2876.

Coleman, J. S. (1966). Equality of educational opportunity. Washington, DC: 1066-5684.

Contini, D. (2013). Immigrant background peer effects in Italian schools. *Social science research,* 42(4), 1122-1142.

Crane, J. (1991). The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing. *American journal of Sociology,* 96(5), 1226-1259.

de Lange, M., Gesthuizen, M., & Wolbers, M. H. (2014). Youth labour market integration across Europe: The impact of cyclical, structural, and institutional characteristics. *European Societies*, *16*(2), 194-212.

De Wolf, I., & Van der Velden, R. (2001). Selection processes for three types of academic jobs. An experiment among Dutch employers of social sciences graduates. *European Sociological Review*, *17*(3), 317-330.

Di Stasio, V. (2014). Education as a signal of trainability: Results from a vignette study with Italian employers. *European Sociological Review*, *30*(6), 796-809.

Di Stasio, V. (2014). *Why education matters to employers: a vignette study in Italy, England and the Netherlands*. Universiteit van Amsterdam.

Di Stasio, V., & Van de Werfhorst, H. G. (2016). Why does education matter to employers in different institutional contexts? A vignette study in England and the Netherlands. *Social Forces*, *95*(1), 77-106.

Dieckhoff, M., Gash, V., & Steiber, N. (2015). Measuring the effect of institutional change on gender inequality in the labour market. *Research in Social Stratification and Mobility*, *39*, 59-75.

DiPrete, T. A. (2002). Life course risks, mobility regimes, and mobility consequences: A comparison of Sweden, Germany, and the United States. *American Journal of Sociology*, *108*(2), 267-309.

DiPrete, T. A., Eirich, M. (2006). Cumulative advantage as a mechanism for inequality: a review of theoretical and empirical developments. *Annual Review of Sociology 32*, 271-297.

Doeringer, P., & Piore, M. J. (1971). Internal labor markets and manpower adjustment. *New York: DC Heath and Company*.

Dörfler, L., & Van de Werfhorst, H. G. (2009). Employers demand for qualifications and skills: Increased merit selection in Austria, 1985–2005. *European Societies*, *11*(5), 697-721.

Dronkers, J., Van der Velden, R., & Dunne, A. (2011). Why are migrant student better off in certain types of educational systems or schools than in others?. *European Educational Research Journal* 11(1): 11-44.

Entorf, H., & Lauk, M. (2008). Peer effects, social multipliers and migrants at school: An international comparison. *Journal of Ethnic and Migration Studies*, *34*(4), 633-654.

Esping-Andersen, G. (Ed.). (1993). *Changing classes: Stratification and mobility in post-industrial societies*. London: Sage Publications.

European Commission (2008). Explaining the European Qualification Framework for Lifelong Learning. Luxembourg: Publications Office of the European Union.

European Commission (2012). Apprenticeship Supply in the Member States of the European Union. Luxembourg: Publications Office of the European Union.

Evans, W.N., Oates, W.E & Schwab, R.M. (1992). Measuring peer group effects: A study of teenage behavior. *Journal of Political Economy*, 100(5), 966-991.

Farkas, G. (2003). Cognitive skills and noncognitive traits and behaviors in stratification processes. *Annual review of sociology*, *29*(1), 541-562.

Fekjaer, S. N. (2007). New differences, old explanations: Can educational differences between ethnic groups in Norway be explained by social background?. *Ethnicities*, *7*(3), 367-389.

Fekjær, S. N., & Birkelund, G. E. (2007). Does the ethnic composition of upper secondary schools influence educational achievement and attainment? A multilevel analysis of the Norwegian case. *European Sociological Review*, 23(3), 309-323.

Fuligni, A. J. (1997). The academic achievement of adolescents from immigrant families: The role of family background, attitudes, and behavior. *Child development,* 68(2), 351-363.

Gangl, M. (2005). Income inequality, permanent incomes, and income dynamics: Comparing Europe to the United States. *Work and Occupations*, *32*(2), 140-162.

Ganzeboom, H. B., De Graaf, P. M., & Treiman, D. J. (1992). A standard international socio-economic index of occupational status. *Social Science Research*, *21*(1), 1-56.

Goldthorpe, J. H. (1996). *Problems of 'meritocracy'*, in A. H. Halsey, H. Lauder, P.Brown and A. S. Wells (eds), *Education: Culture, Economy and Society*. Oxford, Oxford University Press.

Goldthorpe, J. H. (2014). The role of education in intergenerational social mobility: Problems from empirical research in sociology and some theoretical pointers from economics. *Rationality and Society*, *26*(3), 265-289.

Hannan, D. F., Raffe, D., & Smyth, E. (1996). Cross-national research on school to work transitions: An analytical framework. OECD, Paris.

Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (2009). New evidence about Brown v. Board of Education: The complex effects of school racial composition on achievement. *Journal of Labor Economics,* 27 (3), 349-383.

Hanushek, E. A., Woessmann, L., & Zhang, L. (2011). *General education, vocational education, and labor-market outcomes over the life-cycle* (No.17504). National Bureau of Economic Research.

Hartog, J., & Oosterbeek, H. (1988). Education, allocation and earnings in the Netherlands: 0verschooling?. *Economics of Education Review*, *7*(2), 185-194.

Heath, A. F., Rothon, C., & Kilpi, E. (2008). The second generation in Western Europe: Education, unemployment, and occupational attainment. *Annual Review of Sociology*, 34, 211-235.

Heckman, J. J., Stixrud, J., & Urzua, S. (2006). *The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior* . National Bureau of Economic Research.

Heijke, H., Meng, C., & Ris, C. (2003). Fitting to the job: the role of generic and vocational competencies in adjustment and performance. *Labour economics*,*10*(2), 215-229.

Hillmert, S. (2011). Occupational mobility and developments of inequality along the life course: The German case. *European Societies*, *13*(3), 401-423.

Hillmert, S. (2015). Changing structures of opportunity: A life-course perspective on social mobility and reproduction. *European Sociological Review*, *31*(2), 184-196.

Hillmert, S., & Jacob, M. (2010). Selections and social selectivity on the academic track: A life-course analysis of educational attainment in Germany. *Research in Social Stratification and Mobility*, *28*(1), 59-76.

Hillmert, S., & Jacob, M. (2003). Social inequality in higher education. Is vocational training a pathway leading to or away from university?. *European sociological review*, *19*(3), 319-334.

Hoxby, C. (2000). Peer effects in the classroom: Learning from gender and race variation. Working paper no. 7867, National Bureau of Economic Research, Cambridge, MA

Humburg, M., & Van der Velden, R. (2015). Skills and the graduate recruitment process: Evidence from two discrete choice experiments. *Economics of Education Review*, *49*, 24-41.

Jackson, M. (2001). Non-meritocratic job requirements and the reproduction of class inequality: An investigation. *Work, Employment & Society*, *15*(03), 619-630.

Jackson, M. (2007). How far merit selection? Social stratification and the labour market. *The British journal of sociology*, *58*(3), 367-390.

Jackson, M., Goldthorpe, J. H., & Mills, C. (2005). Education, employers and class mobility. Research in Social Stratification and Mobility, 23, 3-33.

Jacob, M., & Weiss, F. (2010). From higher education to work patterns of labor market entry in Germany and the US. *Higher Education*, *60*(5), 529-542.

Jacob, M., Tieben, N. (2010). Wer nutzt die Durchlässigkeit zwischen verschiedenen Schulformen? Soziale Selektivität bei Schulformwechseln und nachgeholten Schulabschlüssen. In Becker, B., Reimer, D (eds.). *Vom Kindergarten bis zur Hochschule*. Wiesbaden: VS Verlag, 145-178.

Kao, G. (2004). Parental Influences on the Educational Outcomes of Immigrant Youth. *International Migration Review*, *38*(2), 427-449.

Kao, G., & Thompson, J. S. (2003). Racial and ethnic stratification in educational achievement and attainment. *Annual review of sociology*. 417-442.

Kao, G., & Tienda, M. (1995). Optimism and achievement: The educational performance of immigrant youth. *Social Science Quarterly*, 76(1), 1-19.

Kao, G., & Tienda, M. (1998). Educational aspirations of minority youth. *American journal of education*, 106(3), 349-384.

Kerckhoff, A. C. (1995). Institutional arrangements and stratification processes in industrial societies. *Annual review of sociology*, 323-347.

Kirsch, M., Beernaert, Y. (2011). Short-Cycle Higher Education in Europe. Level 5: the Missing Link. EURASHE, Brussels.

Klein, M. (2011). Trends in the association between educational attainment and class destinations in West Germany: Looking inside the service class. *Research in Social Stratification and Mobility*, *29*(4), 427-444.

Kogan, I., Noelke, C., Gebel, M. (2011). *Making transition: education and labour market entry in Central and Eastern Europe*. Stanford: Stanford University Press.

Korpi, T., De Graaf, P., Hendrickx, J., & Layte, R. (2003). Vocational training and career employment precariousness in Great Britain, the Netherlands and Sweden. *Acta Sociologica*, *46*(1), 17-30.

Kurz, K., Hillmert, S., Grunow, D. (2006). Increasing instability in employment careers? Men's job mobility and unemployment in West Germany: birth cohorts 1940, 1955, 1964. In Blossfeld, H.-P., Mills, M., Bernardi, F. (eds.). *Globalization, uncertainty, and men's careers: an international comparison.* Cheltenham: Edward Elgar Publishing, 75-113.

Lankford, H., & Wyckoff, J. (1992). Primary and secondary school choice among public and religious alternatives. *Economics of Education review*, *11*(4), 317-337.

Lauer, C., Steiner, V. (2000). *Returns to human capital in Germany. An empirical assessment.* ZEW Discussion Paper No. 00-04. ZEW, Mannheim.

Lauglo, J. (2000). Social capital trumping class and cultural capital? Engagement with school among immigrant youth. [In]: Baron S, Field J, Schuller T, editors. Social Capital: Critical Perspectives. Oxford: Oxford University Press.

Lee, H. (2007). The effects of school racial and ethnic composition on academic achievement during adolescence. *The Journal of Negro Education*, 72(2), 154-172.

Leuze, K. (2007): What Makes for a Good Start? Occupation-specific Higher Education and Graduate Career Mobility. *International Journal of Sociology* 37/2, 29-53.

Leuze, K. (2010): Smooth Path or Long and Winding Road? How Institutions Shape the Transition from Higher Education to Work. Opladen, Farmington Hills, MI: Budrich UniPress.

Leuze, K. (2011): How Structure Signals Status. Institutional Stratification and Labour Market Returns of Higher Education Graduates in Britain and Germany. *Journal of Education and Work* 24/5, 449-477.

Levels, M., Van der Velden, R., & Di Stasio, V. (2014). From school to fitting work How education-to-job matching of European school leavers is related to educational system characteristics. *Acta Sociologica*, *57*(4), 341-361.

Logan, J. A. (1996). Opportunity and choice in socially structured labor markets.*American Journal of Sociology*, 114-160.

Luijkx, R., & Wolbers, M. H. (2009). The effects of non-employment in early work-life on subsequent employment chances of individuals in the Netherlands. *European Sociological Review*, jcp002.

Maharaj, S. I., & Connolly, J. A. (1994). Peer Network Composition of Acculturated and Ethnoculturally-Affillated Adolescents in a Multicultural Setting. *Journal of Adolescent Research*, *9*(2), 218-240.

Manski, C. F. (1993). Identification of endogenous social effects: The reflection problem. *The review of economic studies*, *60*(3), 531-542.

Manski, C. F. (1995). *Identification problems in the social sciences*. Harvard: Havard University Press.

Manzoni, A., Härkönen, J., Mayer, K. U. (2014). Moving on? A growth-curve analysis of occupational attainment and career progression patterns in West Germany. *Social Forces*, *92*(4), 1285-1312.

Mare, R. D. (1980). Social background and school continuation decisions. *Journal of the American statistical association*, *75*(370), 295-305.

Marks, G. N. (2006). Accounting for immigrant non-immigrant differences in reading and mathematics in twenty countries. *Ethnic and Racial Studies,* 28(5), 925-946.

Marsden, D. (1990). Institutions and Labour Mobility: Occupational and Internal Labour Markets in Britain, France, Italy, and West Germany. In Renato B. and Dell'Aringa C. (eds) *Labour Relations and Economic Performance*. New York, NY: New York University Press, pp. 414-438

Marsden, D. (1986). *The end of economic man?: Custom and competition in labour markets.* Wheatsheaf Books, Brighton: UK.

Mayer, K. U., Grunow, D., Nitsche, N. (2010). Mythos Flexibilisierung? Wie instabil sind Berufsbiografien wirklich und als wie instabil werden sie wahrgenommen? *Kölner Zeitschrift für Soziologie und Sozialpsychologie, 62(3),* 369-402.

Mincer, J. (1973). Determining who are the 'hidden unemployed'. *Monthly Labor Review*, 27-30.

Mincer, J. (1993). *Studies in human capital* (Vol. 1). Edward Elgar Publishing.

Mincer, J. (1994). *Schooling, Experience and Earnings*. New York: Columbia University Press

Minello, A. & Barban, N. (2012). The educational expectations of children of immigrants in Italy. *The ANNALS of the American Academy of Political and Social Science*, 643(1), 78-103.

MIUR 2010. Indicazioni e raccomandazioni per l'integrazione di alunni con cittadinanza non

MIUR 2013. Gli alunni stranieri nel Sistema scolastico Italiano. A S 2012/2013

MIUR 2014. Gli alunni stranieri nel Sistema scolastico Italiano. A S 2013/2014

Moffitt, R. A. (2001). Policy interventions, low-level equilibria, and social interactions. *Social dynamics*, *4*(45-82), 6-17.

Müller, W., & Gangl, M. (2003). *Transitions from education to work in Europe: the integration of Youth into EU labour markets*. Oxford: Oxford University Press.

Müller, W., Steinmann, S., & Ell, R. (1998). Education and labour market entry in Germany. In Shavit, Y., Müller, W. (eds.). *From school to work. A comparative study of educational qualifications and occupational destinations*. Oxford: Oxford University Press, 143-188.

OECD. (2012). PISA 2009 Technical Report. Paris: OECD Publishing.

OECD. (2013). *The Skills Needed for the 21st Century.* Paris: OECD Publishing.

Opdenakker, MC., & Damme, JV. (2001). Relationship between school composition and characteristics of school process and their effect on mathematics achievement. *British Educational Research Journal*, *27*(4), 407-432.

Panichella, N., & Triventi, M. (2014). Social inequalities in the choice of secondary school: Long-term trends during educational expansion and reforms in Italy. *European Societies*, *16*(5), 666-693.

Passaretta, G., Barbieri, P., Wolbers, M. H., & Visser, M. (2018). The direct effect of social origin on men's occupational attainment over the early life course: An Italian–Dutch comparison. *Research in Social Stratification and Mobility*, *56*, 1-11.

Pfeffermann, D., Skinner, C.J., Holmes, D. J., Goldstein, H., & Rasbash, J. (1998). Weighting for unequal selection probabilities in multilevel models. *Journal of the Royal Statistical Society: series B (statistical methodology)*, *60*(1), 23-40.

Pollmann-Schult, M., & Büchel, F. (2004). Career prospects of overeducated workers in West Germany. *European Sociological Review*, *20*(4), 321-331.

Portes, A., & Hao, L. (2004). The schooling of children of immigrants: Contextual effects on the educational attainment of the second generation. *Proceedings of the National Academy of Sciences of the United States of America*, *101*(33), 11920-11927.

Portes, A., & Zhou, M. (1993). The new second generation: Segmented assimilation and its variants. *The Annals of the American academy of political and social science* 530.1: 74-96.

Protsch, P., & Solga, H. (2015). How employers use signals of cognitive and noncognitive skills at labour market entry: insights from field experiments. *European Sociological Review, 31*(5), 521-532.

Raffe, D. (2008). The concept of transition system. *Journal of education and work*, *21*(4), 277-296.

Raffe, D. (2014). Explaining National Differences in Education-Work Transitions. *European Societies*. 16(2), 175-193

Rangvid, B. S. (2009). School choice, universal vouchers and native flight from local schools. *European Sociological Review*, *26*(3), 319-335.

Reskin, B. F., McBrier, D. B, & Kmec, J. A. (1999). The determinants and consequences of workplace sex and race composition. *Annual review of sociology*: 335-361.

Rivera, L. A. (2012). Hiring as cultural matching the case of elite professional service firms. *American Sociological Review*, *77*(6), 999-1022.

Roksa, J., & Velez, M. (2010). When studying schooling is not enough: Incorporating employment in models of educational transitions. *Research in Social Stratification and Mobility*, *28*(1), 5-21.

Roscigno, V. J., Tomaskovic-Devey, D. & Crowley, M. (2006). Education and the inequalities of place. *Social Forces,* 84(4), 2121-2145.

Rothon, C. (2007). Can achievement differentials be explained by social class alone? An examination of minority ethnic educational performance in England and Wales at the end of compulsory schooling. *Ethnicities*, 7(3), 306-322.

Ryan, P. (2011). Apprenticeship: Between Theory and Practice. *School and Workplace. Swiss Leading House Discussion Paper*, Working paper n. 64.

Sattinger, M. (1993). Assignment models of the distribution of earnings. *Journal of economic literature*, 31(2): 831-880.

Scherer, S. (2005). Patterns of labour market entry–long wait or career instability? An empirical comparison of Italy, Great Britain and West Germany.*European Sociological Review*, *21*(5), 427-440.

Schindler, S. (2015). Soziale Ungleichheit im Bildungsverlauf – alte Befunde und neue Schlüsse? *Kölner Zeitschrift für Soziologie und Sozialpsychologie, 67(3),* 509-537.

Schindler, S., & Reimer, D. (2011). Differentiation and social selectivity in German higher education. *Higher Education*, *61*(3), 261-275.

Schizzerotto, A., & Barone, C. (2006). Sociologia dell'Istruzione. Bologna: Il Mulino.

Schmidt-Catran, A. W., & Fairbrother, M. (2015). The random effects in multilevel models: Getting them wrong and getting them right. *European Sociological Review*, *32*(1), 23-38.

Schneeweis, N., & Winter-Ebmer, R. (2007). Peer effects in Austrian schools. *Empirical Economics*, 32, 2-3: 387-409

Schneider, S. L., & Tieben, N. (2011). A healthy sorting machine? Social inequality in the transition to upper secondary education in Germany. *Oxford Review of Education*, *37*(2), 139-166.

Schnepf, S.V. (2004). How different are immigrant? A cross-country and a cross-survey analysis of educational achievement. Institute for the Study of Labor (IZA) Discussion Paper No. 1398. Bonn, Germany.

Shavit, Y. (1990a). Tracking and the persistence of ethnic occupational inequalities in Israel. *International perspectives on education and society*. International Perspectives on Education and Society: Volume 2, Greenwich, CT: JAI Press.

Shavit, Y., & Blossfeld, H. P. (1993). *Persistent Inequality: Changing Educational Attainment in Thirteen Countries. Social Inequality Series*. Westview Press, 5500 Central Avenue, Boulder, CO 80301-2847.

Shavit, Y., & Müller, W. (1998). *From School to Work. A Comparative Study of Educational Qualifications and Occupational Destinations*. Oxford University Press.

Shavit, Y., & Müller, W. (2000). Vocational secondary education. *European societies*, *2*(1), 29-50.

Shavit, Y., Arum, R., & Gamoran, A. (2007). Stratification in higher education: A comparative study. Stanford, Stanford University Press.

Spence, M. (1973). Job market signaling. *The quarterly journal of Economics*, 355-374.

Spring, J. (1976), *The Sorting Machine: National Educational Policy Since 1945*, New York: David McKay

Stiglitz, J. E. (1975b). The theory of" screening," education, and the distribution of income. *The American economic review*, *65*(3), 283-300.

Szulkin, R., & Jonsson, J. O. (2007). *Ethnic segregation and educational outcomes in Swedish comprehensive schools.* Stockholm University Linnaeus Center.

Te Grotenhuis, M., Scholte, M., de Graaf, N. D., & Pelzer, B. (2015). The between and within effects of social security on church attendance in Europe 1980–1998: the danger of testing hypotheses cross-nationally. *European Sociological Review*, 31(5), 643-654.

Thurow, L. (1976). *Generating inequality.* New York: Basic Books

Triventi, M. (2013). The role of higher education stratification in the reproduction of social inequality in the labor market. *Research in Social Stratification and Mobility*, *32*, 45-63.

Triventi, M. (2014). Higher education regimes: an empirical classification of higher education systems and its relationship with student accessibility. *Quality & quantity*, *48*(3), 1685-1703.

Van de Werfhorst, H. G. (2002). Fields of study, acquired skills and the wage benefit from a matching job. *Acta Sociologica*, *45*(4), 286-303.

Van de Werfhorst, H. G. (2004). Systems of educational specialization and labor market outcomes in Norway, Australia, and the Netherlands. *International Journal of Comparative Sociology*, *45*(5), 315-335.

Van de Werfhorst, H. G. (2014). Changing societies and four tasks of schooling: Challenges for strongly differentiated educational systems. *International Review of Education*, *60*(1), 123-144.

Van de Werfhorst, H. G., & Mijs, J. J. (2010). Achievement inequality and the institutional structure of educational systems: A comparative perspective. *Annual review of sociology*, *36*, 407-428.

Van der Velden, R. K., & Wolbers, M. H. (2003). The integration of young people into the labour market: The role of training systems and labour market regulation. *Transitions from education to work in Europe: The integration of youth into EU labour markets*, 186-211.

Wade, J. C., & Okesola, O. (2002). Racial peer group selection in African American high school students. *Journal of Multicultural Counseling and Development*, *30*(2), 96-109.

Weiss, A. (1995). Human capital vs. signaling expansions of wages. *Journal of Economic Perspectives*, 9, 133-154.

Weiss, F. (2013). *Postsecondary educational careers and social inequality: an analysis of social origin differences in educational career trajectories and their labor market outcomes in the US, Sweden and Germany.* Doctoral dissertation, University of Mannheim.

Weiss, F., & Roksa, J. (2016). New dimensions of educational inequality: Changing patterns of combining college and work in the US over time. *Research in Social Stratification and Mobility*, *44*, 44-53.

Wolbers, M. H. (2003). Job Mismatches and their Labour-Market Effects among School-Leavers in Europe. *European Sociological Review*, *19*(3), 249-266.

Wolbers, M. H. (2007). Patterns of labour market entry: a comparative perspective on school-to-work transitions in 11 European countries. *Acta Sociologica*, *50*(3), 189-210.

Wolbers, M. H., Luijkx, R., & Ultee, W. (2011). Educational attainment, occupational achievements, career peaks: The Netherlands in the second part of the twentieth century. *European Societies*, *13*(3), 425-450.

The route from school to employment is often depicted as a decisive step in individuals' life course: young adults should be ready to apply knowledge and skills in jobs that match their training and satisfy their professional aspirations. Patterns of labour market entry, however, are often far from being smooth, predictable, and successful. In this book we explore different aspects characterizing school leavers' integration into the labour market. The focus is on macro determinants, namely whether the arrangements of the education and training system influences labour market entry, and on micro factors, namely the importance of different types of skills for a successful transition. Special attention is also given to the debate on inequality of opportunities, and whether different patterns of labour market entry and the moderating role of the institutional context weakens or reinforces the social stratification of labour market outcomes.